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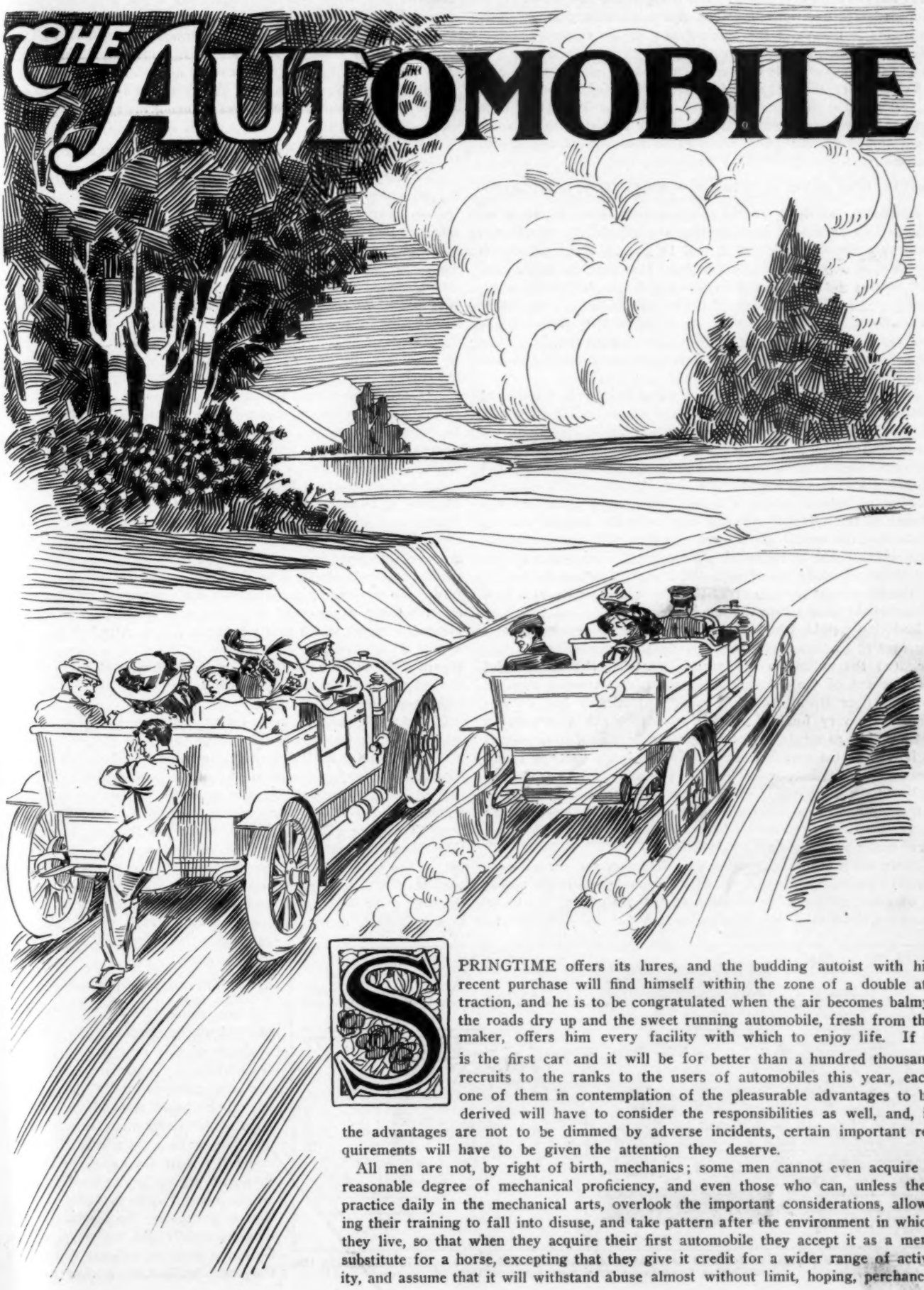
THE AUTOMOBILE



SPRINGTIME offers its lures, and the budding autoist with his recent purchase will find himself within the zone of a double attraction, and he is to be congratulated when the air becomes balmy, the roads dry up and the sweet running automobile, fresh from the maker, offers him every facility with which to enjoy life. If it is the first car and it will be for better than a hundred thousand recruits to the ranks to the users of automobiles this year, each one of them in contemplation of the pleasurable advantages to be derived will have to consider the responsibilities as well, and, if the advantages are not to be dimmed by adverse incidents, certain important requirements will have to be given the attention they deserve.

All men are not, by right of birth, mechanics; some men cannot even acquire a reasonable degree of mechanical proficiency, and even those who can, unless they practice daily in the mechanical arts, overlook the important considerations, allowing their training to fall into disuse, and take pattern after the environment in which they live, so that when they acquire their first automobile they accept it as a mere substitute for a horse, excepting that they give it credit for a wider range of activity, and assume that it will withstand abuse almost without limit, hoping, perchance,

that steel has life everlasting. The trusty horse has something of an advantage over an automobile, due to his ability to lay down when he is tired, but the automobile must go on and on until it pulls asunder, and in the process presents the only evidence of abuse that is acceptable to the non-mechanical mind. In the case of the horse, it is very rarely that the loading is so excessive as to stall the animal; humane considerations have their wide and useful influence, but it is very rarely that the human attribute influences for good when an automobile is taken into account.

METAL MUST BE TREATED IN CONFORMITY WITH LIMITED LIFE

The first point to consider when an automobile is being placed in commission must be that the life of the material is positively limited, and that it will be prolonged in proportion to the care with which it is handled. Metallurgists, while they fail to give definite reasons in many of their statements in relation to the life of structural material in actual use, quite generally agree with each other, to the effect that strains, shock and especially alternate vibrations tend to shorten the useful life of the material, and this tendency becomes very marked indeed when the material is overworked.

This is by no means a place in which to indulge in a technical discussion of the vibratory value of steel and other structural materials which are in common use in automobiles, but there are two or three plain truths which the new autoist can afford to take under advisement until experience will come to his assistance and enable him to think rationally for himself. In order to properly understand this situation, it is necessary to go back into the history of the automobile to the time when the designs were so crude that the weight of the cars was in considerable excess of that which could be tolerated. Designers, in view of this consideration, exerted themselves to the utmost to reduce the weight of the component parts in order that the weight of the cars as a whole would come within the requirement.

Reducing weight, while it was an evolutionary process, involving four or five years of persistent effort, demanded two things, *i. e.*, (a) the utilization of dynamic material, (b) the careful working out of the proportions of the parts in order that the extreme fiber strain would be within practicable limits. Engineers are very fond of quoting what they call a dictum, "a chain will be as strong as its weakest link." This dictum sounds as if it were the very essence of wisdom, but a chain is by no means an automobile, and while it is a relative simple process to make all the links nearly of the same strength in a chain, it is extremely difficult to make all the members of an automobile so harmonious in their several relations that they will each of them serve under precisely similar conditions.

There are a thousand reasons why designers are not yet prepared to assure equality of work of the several parts in the makeup of a car, although the situation at the present time is almost up to the point where standardization may become a reality. In the meantime when the new automobile is put into commission, it will be well to remember that legitimate expectation is positively limited to the loading of the car within the limits as fixed by the number of seats available as it comes from the maker. Any extra weight which is placed as a burden upon any automobile is bound to react against the owner, and it is sure to add to the cost of maintenance besides reducing the useful life of the car.

A CAPABLE KIT OF TOOLS SHOULD BE CARRIED ALONG

In discouraging the undue addition of burden to a car, it should not be understood that a reform will be wise, if it results in the undue limiting of the tools which an autoist should have available. It makes no difference who builds an automobile, of what material it is made, or how good a design, it is subject to all the fundamental laws, and its parts are likely to become deranged under road conditions, so that good tools are of the greatest importance and, unfortunately, the conditions under which they are usually required are those which do not permit of falling back upon a repair shop. Even if repair shops were so closely spaced as to permit one to rely upon them entirely, the fact remains that it is an expensive experiment to call for help at the nearest repair shop, under such conditions. It is reasonable practice to trust the repair man whose capabilities are established and known to the owner of a car, but it is not safe to call for help, in a remote district, from a repair man who does not feel the responsibility of doing work for a regular customer.

A roadside repair is best made by the owner of the car, and in order to be able to do so it is necessary to have in hand, for ready use, a wise selection of capable tools. In the selection of tools, account must be taken of the market conditions in which it seems that there is a wider variety, from the point of view of quality, in the hardware line, than there is in any other class of trade. To the inexperienced autoist, for illustration, all files look alike, but the experienced mechanic is perfectly aware of the great differences which exists between them. At all events, the autoist, as he must face a breakdown on the road, is compelled to regard a file as his substitute for a lathe, shaper, planer, grinder and all the other machine tools which are at the disposal of the builder of the car.

If a file becomes of such extraordinary importance, and it surely does, considering the fact that one good file will outlast a thousand bad ones, it is a mere illustration of the same condition as it obtains in connection with all the tools which should be carried along. Emphasizing the necessity of having available a competent tool kit is by no means licensing a burdensome excess. Tools are difficult to store, and when they are in excess they defeat prompt work, because the useless devices invariably get in the way, and the trouble involved in finding the right ones is accentuated. A self-contained condition of autoing, considering a car which starts out in good working order, should be a reasonable expectation, were a kit of tools to be made up as substantially set forth elsewhere in this article.

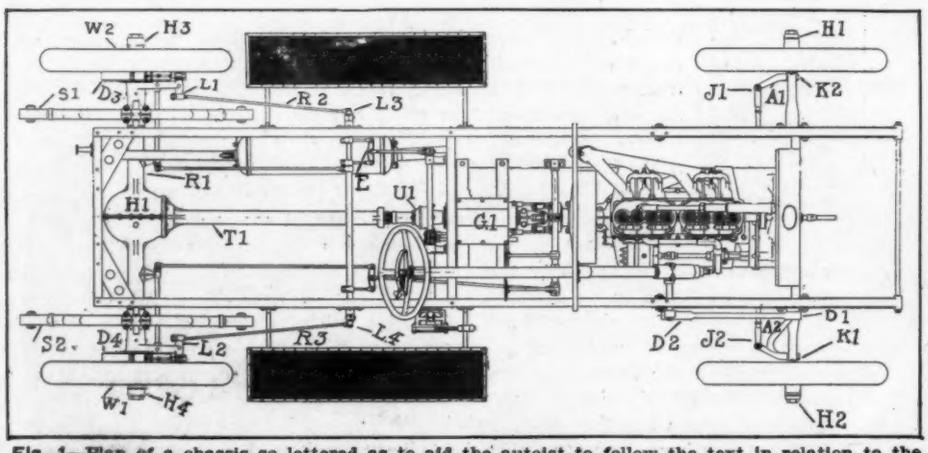


Fig. 1—Plan of a chassis so lettered as to aid the autoist to follow the text in relation to the putting in commission of a new automobile.

CLOSE INSPECTION IS DESIRABLE

A new automobile is supposed to be in good working order; it even offers evidence of this necessary qualification when it is delivered to the owner's garage under its own power, or when it responds to a sufficient demonstration to warrant its owner in making the purchase. Even under the most favorable conditions it is wise, especially for a new autoist, to expend quite a little of his time in going over the mechanism in detail, partially for the purpose of becoming familiar with the construction, and finally with a view to as-

certaining if all the units are properly related to each other, and if the bolts are fetched up with their heads against the bosses, the nuts in tight relation and the cotter pins in place.

Fig. 1 presents the outline of a chassis, and will be utilized in a further discussion of this part of the subject for the purpose of aiding the reader. Beginning at the front of the car, the knuckles K1 and K2 should be examined to see if there is lost motion, and by jacking up the front axle, it will then be easy to find out whether or not the joints are too tight, and it must be remembered that there is just as much chance of future trouble in a joint that is too tight as there is in one when it is slack. While the front knuckles are receiving the attention they deserve, it is an excellent time to back off the hub caps H1 and H2, then remove the knuckle spindle nuts, take the wheels off and carefully inspect the front wheel bearings. If the grease looks offcolor, it will be an excellent idea to clean the bearings and the cavities of the hubs, using a scraper in so far as it becomes necessay, and kerosene oil for the most part. At all events, it is well worth while making sure that the bearings are with a little "shake," which means that they should respond to pressure and show that they are not bound, and they should be scrupulously clean and then reassembled, after which the wheels can be returned to the spindles, the hub nuts screwed on, cotter pins put back, and the last operation should be to pack the bearings with a suitable grade of grease and screw the hub caps H1 and H2 tightly into place.

It would be regarded as a careless undertaking, were an autoist to consider the front axle inspection completed without examining the steering arms A1 and A2, the joints J1 and J2 and the drag rod connections D1 and D2. These joints should be dissembled, cleaned out most thoroughly, and after reassembling they should be packed with a suitable grade of lubricating grease. Many of the better grades of automobile makers boot these joints in order to protect them against the silt of the road, and also to keep them in a state of copious lubrication, which is due to the means afforded to keep the grease in.

LIVE REAR AXLE OFFERS EXTRA OPPORTUNITY

The front axle should be given attention on account of its relation to steering, and the hazard which comes if the steering functions are not on a substantial basis. The rear axle is of equal importanc,e since, if it becomes deranged, power may not be transmitted to the point of contact of the tires with the road. It is the front axle then, which must be examined on the ground of safety, and the rear axle, for the reason that it is a power transmitting device. Referring again to Fig. 1, the rear axle R1 takes its power from a shaft which connects between the transmission gear G1 and the bevel drive, which is in the housing H1 of the axle. The shaft is enclosed in a torsion tube T1, and a universal joint U1 takes care of the relative moton between the axle and the chassis. The wheels W1 and W2 are in rigid relation with the jackshafts which connect with the bevel drive through the differential, all of which members are enclosed in the axle tube, with its central enlargement H1. It is not believed that a new autoist should be so venturesome as to attempt to dissemble this aggregation of extremely important transmission members, but he should understand that all the covers should be screwed down tight after the parts to whatever extent they are get-at-able through handholes are inspected, rendered perfectly clean and properly packed in a suitable lubricant. The hub cap H3 and H4 should be screwed into place last, and a very good way to make sure that lubrication will be profuse is to fill the caps with grease before screwing them into place.

BRAKES SHOULD BE ADJUSTED WITH DISCRIMINATING CARE

There are several problems in connection with brakes which have to be coped with almost independent of the design of an automobile. The rods R2 and R3 are diagonally placed in their relation between the lever L1 and L2 and the cross-rod levers L3 and L4. The result is that the tightness of the brakes will be variable depending upon the extent of loading of the body as it varies the compression of the rear springs S1 and S2. It is for this reason that an overloaded car, when it is going down a grade, is likely to have its brakes deranged, and accidents are thereby courted.

The extent to which the brakes are likely to become deranged as a result of excess loading will depend upon the length of the rods and the angularity. The length is intended to be sufficient for automobiles that are not overloaded, but the angularity will increase with overloading, and experienced autoists take into account the variable which is present and make brake adjustments accordingly. In some automobiles it is necessary to so adjust the brakes that they will press slightly against the drum faces when the load is light, in order that the brakes will work when the load is normal.

When the brakes are applied, the pressure to the two sides is equalized through the use of an equalizer E, but the adjustment must be so nicely made that the equalizer will be free to act. Unless pressure is applied equally to the drums D3 and D4, the brakes will fail to perform their function satisfactorily, and the tires will be subjected to undue strains. The ability of any set of brakes is limited to the tractive ability of the tires in contact with the roads, and if the equalizers fail to work, and the braking effort is thrown entirely to one road wheel, skidding is induced and the results are but little better than if no brakes are used. The maximum brake effect is always present when the shoes press on both sets of drums uniformly, and just to the point which approaches the maximum adhesion. The instant adhesion is overcome, the ability of the brakes falls off to a nominal point.

THERE IS A PROBLEM RESIDING IN THE TIRES

It is inexpedient to discuss brake adjustments without taking up the tire problem, and it is the new autoist who fails to appreciate the true situation. A car will respond most willingly to the pressure of the brakes if the same is applied skillfully and without undue haste. It takes four measures of power to

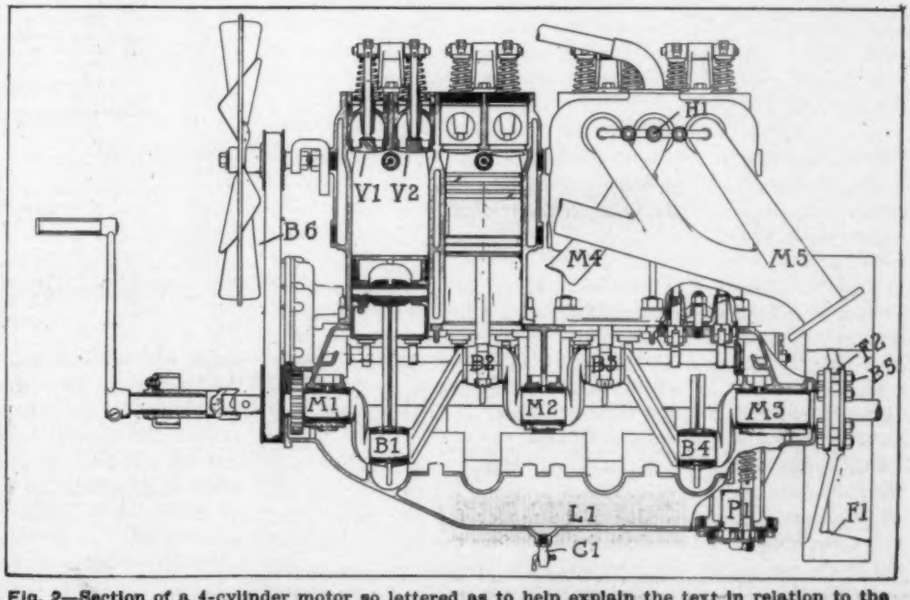


Fig. 2—Section of a 4-cylinder motor so lettered as to help explain the text in relation to the inspection of a new motor before extended use

accelerate the speed of a car to double a given value in a given time, and this statement when inverted may be rearranged as follows: It puts four times as much work upon the tires if the motion of a car is arrested within half of the given distance. This will be true if the wheels are not induced to skid, but after skidding begins the damage which may be done to tires must be confined to the realm of speculation. The tire situation, in view of what has been said, will be less of a problem if the brakes are applied with deliberation and soon enough to permit the car to be brought to rest without the expenditure of a great effort.

There are very few autoists who are able to get away from the idea that tires may be inflated to excess by means of a hand pump. It is quite impossible to inflate any set of tires such as are used on automobiles to a point where the pressure will be greater than that which the fabric should be capable of retaining. The life of tires is enormously reduced when they are flexed repeatedly under load as they invariably will be if the air pressure is insufficient. The one rule which, if observed, will make the most marked saving in cost of maintenance, is that involving the inflation of tires to a point considerably beyond the present average practice.

Tire life is much shortened if the tire on one side is inflated differently from that of the other. The wheels will not then cover the same distance over the ground per revolution, and as a result they tend to roll around in a circle, but since they are restrained from doing so they drag. It is this continued and useless effort which is expended at the point of contact of the treads of tires with the road bed that is at the foundation of much of the tire depreciation which is experienced.

The safe rule is to inflate all the tires equally, and to employ a gauge in order that the pressure may be observed with certainty. It is not possible for any man to decide in the absence of a gauge the extent of pressure in a tire. If the tires are inflated sufficiently, they will cease to do the work which properly belongs to the springs, and if the springs are stiff or improperly designed, the performance of the car on which they are used will be unsatisfactory at high speeds, even on a good road. Under such conditions it will still be good practice to inflate the tires sufficiently to protect them against flexure, and the remedy to take advantage of in order to limit undue vibration lies in limiting the speed of the automobile on the road to the point which will eliminate evidences of excess vibration. At all events, referring to Fig. 3, A represents a side view of a tire when it is properly inflated, B is an end view of the same tire, C is a side view of the tire when it is not properly inflated and D represents the same tire looking at it from the other plane. These views, which were furnished by the Diamond Rubber Company, indicate very clearly what tire makers have in view from the point of view of insufficient inflation of tires, and, as they point out, it is impossible to expect good result if the fabric is flexed as it will be if the tires are not fully inflated.

SOME FURTHER MOTOR CONSIDERATIONS

Referring to Fig. 2 of a motor in part section, F1 is the flywheel, the function of which is to store energy for a part of each cycle and deliver the same to the transmission system during the remaining portion of the same. The very fact that a flywheel is capable of absorbing energy is reason for believing that it must be securely held in place. Were the flywheel to come loose it would do much damage, the reason for which lies in the amount of energy which would be set free in so short a time. As a rule, the flywheel is flanged F2 to the crankshaft and the holding bolts B5, of which there are usually six, should be tightened up, and it would be a good idea to see that they are properly locked into permanent relation.

Lubricating oil L1 is held in the pan at the bottom of the case and the cock C1 is placed to afford a means for drawing off the oil at frequent intervals. It will be proper for the owner of a new automobile to draw off all the oil before the car is taken out, and after cleaning out the case, new oil, of a proper grade, should be put back. The oil pump, if it is located in the case P1, should be examined to see if it is in good working order, or, if it is located elsewhere, it may be examined for the same purpose. The pump drive will demand a moment's attention and if a "dog" is utilized in the system of driving, it will be well to observe if the parts are tight and in good working order.

The connecting rod bearings B1, B2, B3 and B4 should be so fitted that there will be little heating, and, if the case is provided with a hand-hole, it will be a simple task for the autoist to remove the cover, take ahold of the connecting rods, one after the other, and feel the shake or lost motion. There should be a little lost motion, but not enough to be more than barely noticeable.

LIST OF TOOLS TO TAKE ALONG

1 8-inch Stillson wrench.
1 14-inch Stillson wrench.
1 Hawkeye Stillson wrench.
1 6-in combination pliers.
1 10-inch combination pliers.
1 machinist's screw plate with taps and dies in hardwood case, for 3-16 to 5-8-inch U. S. thread.
1 adjustable hack saw frame.
2 dozen hack saw blades.
1 8-inch Coe's monkey wrench.
1 12-inch Coe's monkey wrench.
1 set of S wrenches for 1-4, 5-16, 3-8, 7-16, 1-2 and 5-8 hexagon heads.
1 B & S adjustable spanner wrench.
1 geared breast drill with Morse twist drills up to 5-8 inches in diameter by 1-32 increments, preferably of high speed steel with duplicates of below 1-4 inch.
1 substantial gasoline blow torch.
1 pound of stick solder.
1 package of soldering flux.
1 substantial hand vise with jaws to open 1 inch.
1 6-inch round second cut file.
1 8-inch round second cut file.
1 12-inch round second cut file.
1 8-inch half-round second cut file.
1 12-inch half-round second cut file.
1 10-inch half-round bastard file.
1 10-inch half-round smooth file.
1 8-inch flat second cut file.
1 12-inch flat second cut file.
1 10-inch flat bastard file.
1 10-inch flat smooth file.
1 10-inch feather edge bastard file.
1 10-inch feather edge smooth file.
NOTE.—All files to be Black Diamond or equal quality.
1 assortment of file handles.
1 pair of circular snips, length 11 inches.
1 center punch.
1 4-inch machinist's screw driver.
1 6-inch machinist's screw driver.
1 10-inch machinist's screw driver.
1 small India oil stone.
1 2-pound ball pein machinist's hammer.
1 7-16-inch cold chisel.
1 5-8-inch cold chisel.
1 7-8-inch cold chisel.
1 diamond point chisel.
1 cape chisel.
1 roll insulating tape.
1 bundle copper wire.
1 roll 18-ounce copper.
1 sheet of asbestos packing.
1 kit of substantial tire tools.
1 set of patches for tubes.
1 package of tire cement.
1 package of acid cure for tube repairs.
1 substantial tire pump with pressure gauge.
1 foot of hose of a size to repair joints in water piping.
1 extra pair of hose clamps.
1 bundle of No. 14 B. & S. G. iron wire.
1 gallon can of lubricating oil.
1 can of grease for lubricating.

The main bearings M1, M2 and M3 are not so readily examined, but it will be possible to run the motor for a time and then feel the bearings to determine the extent of heating.

The man of no experience will make mistakes when bearings are being examined, he will find that they do heat up quite a little, and he will be likely to reach the conclusion that the heating effect is in excess. All bearings, when they are running under the most efficient conditions, will heat up so much that they will feel quite warm. Good service may be had from a bearing even when the increase in heat is all that the hand will stand with comfort.

The manifolds M4 and M5, one from the carbureter and the

other from the exhaust transfer ports, should be examined to see if the holding bolts H1 are tight. If the manifolds (especially the intake) are not tight on their seats the motor will fail to perform properly. In the same way it will be a good idea to go over all the bolts and tighten them up, but the inexperienced man must be careful not to put too much pressure on, especially if a long wrench is used. It is on this account that S-wrenches are recommended; they are made in proper lengths considering the sizes of heads of nuts that they will accommodate. Even then pressure must be carefully limited to prevent pulling a head off.

1 extra tire case.
1 cover for tire case.
5 inner tubes.
NOTE.—If front and rear wheels are different sizes, provide extra tubes and cases for each size.
1 set of special tools if demanded considering the design of the automobile.
1 jack.
1 box of tire powder.
1 box cotter pins.
1 set of bolts, nuts and screws.
1 foot of proper size key stock.
1 box assorted rivets.

SMALL GARAGE TOOL EQUIPMENT

NOTE.—In addition to the tools specified for the automobile, which will be available for use in the garage the following equipment will be proper:

1 4 1-2-pound blacksmith's hand hammer.
1 20-pound blacksmith's hammer.
1 heavy machinist's pein hammer.
1 set cold chisels.
1 2-inch hide-faced hammer.
1 extra set of files.
1 7-inch toolmaker's swivel, universal vise.
1 400-pound blacksmith's anvil.
1 anvil block.
1 substantial machinist's bench.
1 scientific portable forge.
1 post drill with self-feeding mechanism. Chucks to take 3-4-inch drills and down.
1 heavy pattern breast drill.
1 extra set of high speed steel drills from smallest up to 5-8-inch, inclusive.
1 rachet drill set.
1 set of ratchet socket wrenches.
1 18-inch Stillson wrench.
1 set machinist's clamps.
1 set of spring dividers and calipers.
1 B & S combination square, with 12 and 18-inch graduated blades.
1 graduated hardened T square of medium size.
1 blacksmith's rule.
1 surface gauge.
1 depth gauge.
1 micrometer set.
1 thread gauge.
1 set bearing scrapers.
1 cross oil filter.
1 60-gallon lubricating oil tank.
1 gasoline storage tank.
1 set of oilers.
1 waste can.
1 waste storage box
1 set fire extinguishers.
1 washing set.
1 box for washing materials as soap, chamois skin, etc.
1 vulcanizing set.
1 dark closet for tires.
1 box assorted rivets.
1 box assorted bolts and nuts.
1 assortment of mild steel for stock.
1 assortment of key stock.
Such other tools as the situation warrants.

The belt B6, which transmits the power to drive the fan, should be tight enough to serve the purpose, and a general examination of all the small parts, as well as the bearings and drives for the pump and magneto, will lead up to the last point, i. e., the grinding of the valves V 1 and V 2, which are the inlet and exhaust valves in each cylinder. This is a process which will have to be undertaken sooner or later after an automobile is put into service, and it is of such importance that it will be treated as a separate matter and at some length in THE AUTOMOBILE at an early moment. In view of the wide variation in valves and the arrangement of them it is necessary to illustrate the points to be made.

AT FIRST GLANCE MECHANISM LOOKS COMPLICATED

Fig. 4 shows the right side of a four-cylinder motor in its right position in a chassis, with the bonnet off, presenting the accessories in their correct relation. To a man of no experience, a look under the bonnet must have a very disconcerting effect. The carbureter C1 occupies a midposition between the cylinders, and the intake manifold M1 completes the connection between the carbureter and the two pairs of cylinders. The magneto M2 is partially hidden by the chassis frame S1, but the wiring passes almost vertically up, thence across the top of the cylinders to the spark plugs S2, of which there are four in sight on the right side of the motor, and the timer T1 stands above the level of the cylinders in a midposition with its wiring, which passes across to the opposite side of the motor connecting with four spark plugs which are there placed. The coil C2 is on the dashboard D1, which connects to the spark plugs through the high-tension wiring system, and to the timer T1, thence to the battery, forming the low-tension system.

The steering post S3 passes through the dashboard to the steering gear G1, and the spindle of the gear connects with the steering arm A1, through a square end and a clamping bolt C3. It is extremely important that the clamping bolt C3 be examined and tightened up sufficiently to eliminate any evidence of lost motion, and if the autoist cares to disassemble the parts, he will find that the bolt intercepts the spindle when it is in place, a groove being furrowed out for the purpose, and in this way the arm is prevented from jarring off of the spindle.

The opposite side of the motor, which is shown in Fig. 5, presents the exhaust manifold M1, and the lubricator L1 is shown a little to the fore and below the exhaust manifold, partially hidden by the chassis frame. The lubricator is kept sufficiently warm in this position to serve a useful purpose, but it is important that the pipes be tightly connected and the lubricator kept scrupulously clean, in order that a glance will suffice during the inspection period, to indicate that the parts are in the right relation and in good working order. The radiator R1 is connected to the water jackets of the cylinders by a piping system, in which the rubber hose R2 and R3 complete the piping, and this method is employed in order to abort the ills of vibration by inducing a sufficient measure of flexibility.

In the operation of the car, it is necessary to avoid overheating of the cooling water, and this will be accomplished if the spark is not retarded after the motor is started. It is generally true that overheating follows if the motor is run without load on a retarded spark, and it is economy in every possible way to stop the motor if the car is to stand for any length of time.

The best position of the spark, when a motor is running, depends upon speed. This question of timing is one which will have to be taken up in the long run as a separate subject, but for the present it will be desirable to observe that the running conditions of the average motor, considering a magneto, demand that the spark be advanced from 20 to 30 degrees, depending upon the speed of the motor. This statement should be qualified by calling attention to the practice in taxicab and some other work of running on a fixed spark, in which case the advance is not far from 30 degrees, but this is not the common practice among the several builders, nor do they seem to agree as to the best fixed advance. The probabilities are that account must be taken of the characteristics of the ignition system, and it is true that there are differences in the performances of the several makes of magnetos sufficient to demand that each case be investigated upon its merit. The makers of automobiles are supposed to look after details such as this, and it will be enough for the autoist of small experience to acquaint himself with the structural details sufficiently for him to make necessary adjustments. It would be ill advised on the part of any new autoist to tamper with the ignition system. It is scarcely likely to give trouble unless it is neglected for a long period of time and it is too complicated for the layman to tamper with. The autoist who desires to enjoy riding in the absence of petty annoyances will take particular pains to keep the entire ignition system scrupu-

ously clean and to study the particular ignition apparatus employed in his car so that its wants will be fully appreciated.

TRANSMISSION GEAR DETAILS

There are four types of transmission gear systems in common use:

(a) Planetary gear systems.
(b) Progressive sliding gear systems.
(c) Selective sliding gear systems.
(d) Friction drives.

The planetary gears are invariably housed, and they should be so well encased that semi-hard lubricant will remain within. If the case has bolted ends and they do leak lubricant, it becomes necessary to go over the bolts and tighten them up sufficiently to stop the leak. It is quite useless to attempt to run a planetary gear unless the sun and planets are substantially submerged in the lubricating material. The sun, in this case, is the central pinion, which is fastened to an extension from the crankshaft of the motor, and the planets are made up of relating square cut pinions of which there are either two or three sets disposed around the periphery within the case, the idea being to establish a balanced relation, which could not be done were there but one planetary set rotating around the sun. It is true, however, that a single planetary set would serve from a purely mechanical point of view, disregarding static and kinetic balancing conditions, of course.

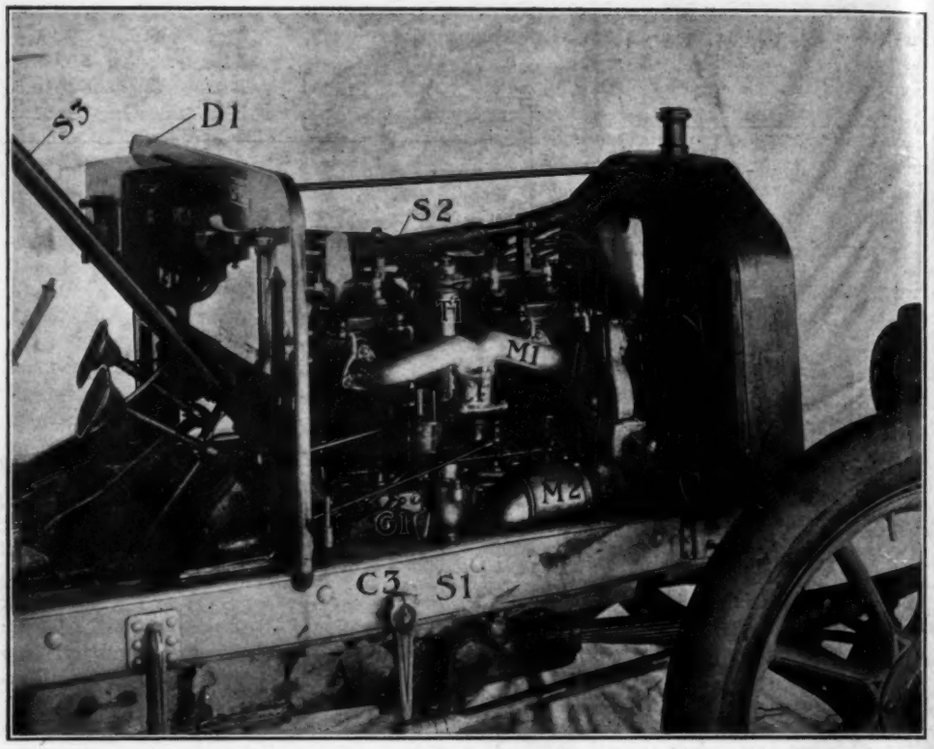


Fig. 4—Right side of a 4-cylinder water-cooled motor used to point out relations of accessories and relating parts

When the planetary gear is in the position which drives the car at the maximum speed (on high) the entire set of planets, and the relating sun, rotate as a unit, and the only work which they do is that of transmitting the torque of the motor, so that if they are strong enough to stand the torque stresses, there is nothing more required of them, and the transmission is done noiselessly and well. When the second speed is utilized (also reverse) the planets revolve around the sun, and, no matter how well the system is made, it is apparently impossible to so perfectly fit such an intricate system of gearing as to eliminate noise entirely. Grease seems to be the cure for this noise tendency, and the only danger lies in allowing the grease to remain within the case too long. The new autoist may take it for granted that the lubricating qualities of grease or oil wear out in time, just as everything else depreciates, and when these lubricating qualities depart from the mass, what is left is a slimy grit holding non-lubricating product, which it is well to be rid of. Perhaps kerosene oil, if it is forced in by means of a gun, will help to rid the internals of the case of this undesirable worn-out grease, but if the autoist does not like the undertaking which he may thus impose upon himself, the remedy lies in selecting a rather heavy grade of lubricating oil, instead of semi-hard grease. The trouble with the lubricating oil is that it will not stay in unless the case is quite tight. Under the circumstances, a good deal of importance should be attached to having a tight case on a planetary gear.

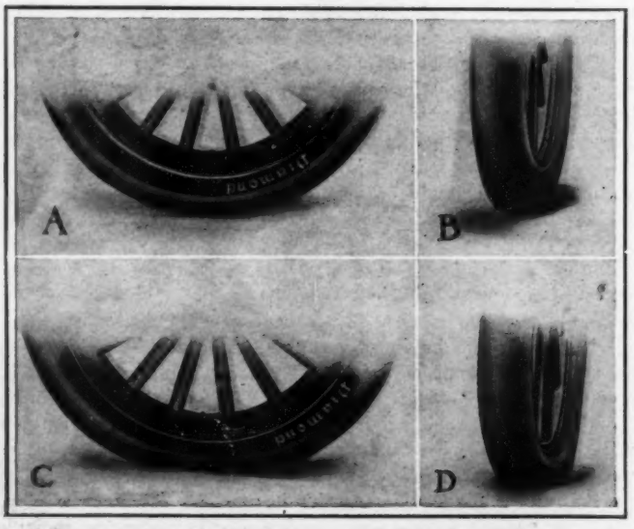


Fig. 3—Diamond tires under different conditions of air pressure and used to illustrate the need of proper inflation

Considering sliding gears, there are certain details which may be regarded as common to them, whether or not they are selective or progressive in their scheme of design. Before proceeding it may be well to point out that in the progressive system, which is used on a very few of the larger and more powerful cars, it is impossible to slide from one speed to another shifting and skipping at will. It is what the word implies, the sliding members are so arranged that the speeds are changed from low to second, to third and fourth, or vice versa, and from low into reverse. In the selective system, the operator may slide the gears for any one of the combinations at will, but it devolves upon him to maintain a proper relation as between a gear ratio, speed of the car, and ability of the motor.

With a new car, it would be a good idea to remove the handhole covers from the top of the transmission gear case, take out all of the lubricating material therein contained, wash the system out most thoroughly, and inspect all the bearings, the bottom of the case, and the crevices everywhere, with a view to making sure that there are no stray bolts, nuts, or other foreign substances laying around loose. The next operation will be completed when it is determined for a certainty that the gears register with each other with flush faces when the lever

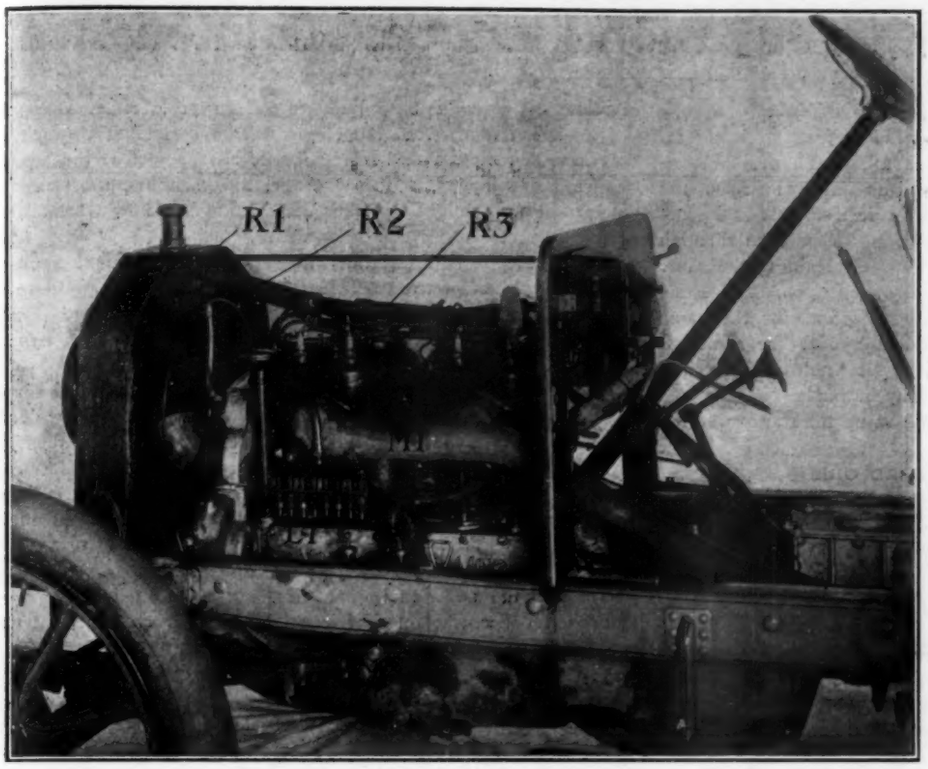


Fig. 5—Left side of a 4-cylinder water-cooled motor in a chassis showing the location of the oiler and manifold for the exhaust

is thrown into its respective notches. Unless the sliding system is properly adjusted, the mating gears will not register with each other, and if they overhang, it follows that the work will not come over the whole face of the engaging teeth. Under such conditions it is only a matter of a short while when the faces of the teeth will have furrows worn in them, and it is just possible that the teeth will be broken off because the work will be concentrated upon a relatively small section of the metal. Then, too, the pressure will come on less than the whole surface at the pitch line, and this may be the cause of additional trouble. If it is found that the registry is not perfect, there is nothing to be done but to make such adjustments as will overcome the difficulty. It is not a situation to be tolerated under any circumstances.

It will be well worth while to examine the bearings before putting the cover back on the transmission gear case, and if possible they should be thoroughly washed and especial notice should be taken of the presence of any foreign matter as metal filings or other hard substances which, if not removed, would destroy the highly polished surfaces of the balls, and score the raceways as well.

In view of the presence of ball bearings which owe their great utility to the use of alloy steel of particularly hard selections and highly polished surfaces, care must be exercised in the selection of the lubricant which is to be used in the transmission gear-case and in the ball-bearing housings. If the lubricant has an acid reaction, or if it is made up of materials which will soon bring about the destruction of the polished surfaces of the balls and the races, thus introducing a high depreciation factor of the car as a whole, due to the relatively high cost of the bearings.

The autoist will have to deal with some one type of the clutches, as follows:

(A) Leather faced cone clutches.
(B) Leather faced cone clutches with cork inserts.
(C) Multiple disc clutches.
(D) Dry-plate clutches.
(E) Disc types of clutches.

The leather faced clutches are usually provided with flat or other suitable springs by means of which they are pressed into intimate contact with a relating member of the clutch, and unless the leather is maintained in a pliable state free from the excesses of lubricating oil, it will slip, and if it does slip, the excess heat generated will char the leather and it will cease to be pliable, after which it will fail to serve any useful purpose at all. The remedy lies in keeping the clutch free from accumulation of oil, and to permit soft but firm engagement, rather than to allow the clutch to slip. The other types of clutches should be kept clean, free from excess lubricant and in order.

STEERING ADVANTAGEOUSLY

Racing drivers, despite their apparent carelessness, may well be patterned after by those who have yet to learn the best way to grasp the steering wheel and be in a position to act in precise accord with the varying requirement. Fig. 6 is taken as representative of the racing driver's position, and attention is called to the point on the rim below the horizontal center, where the right hand firmly grasps the rim with the forearm horizontally disposed, describing a right angle. Inexperienced autoists take a hold of the wheel very much as if they were afraid of it, and with both hands they hang on, generally grasping the rim at diametrically opposite points, or, what is worse, at points above the horizontal center. The arm muscles, under such conditions, are in the position of the greatest disadvantage, and body bracing becomes impossible. The illustration is sufficiently clear on this point to require no further discussion at length, and it is recommended that inexperienced autoists study this situation until they are able to determine for themselves the most natural and advantageous position it is possible for them to assume, considering the location of the wheel, with respect to the seat, in the car they elect to drive.

Fig. 6—Offered to illustrate the manner in which racing drivers grasp the steering wheel

How Efficient Lubrication Reduces Maintenance

BODY of lubricants while it is hard to define and equally difficult to measure, may be arrived at from a consideration of its results, which, after all, is the desideratum. Thus, this desired quality may be found as follows: Select the lubricant for which the body quantity is desired, test it in any recognized means for coefficient of friction. Then turn through some known or measurable angle of torsion, retaining the same size, same load, same pressure per square inch, and same temperature, measuring the coefficient of friction for the same oil again. This will give a series of results for the same oil under similar conditions, but for different angles of torsion, from which results proper deductions may be made.

One series of tests which were made some time ago resulted as follows:

WINTER STRAINED LARD OILS

Test Number	Torsion in Deg.	Coefficient of Friction	Temp. F.
1	33	.0233	72
2	25	.0176	—
1	31	.0218	—
2	24	.0169	—
1	30.5	.0215	—
2	23.5	.0166	—
1	29.5	.0208	—
2	23	.0162	72

ENGINE OILS.

Load 200 lbs. Pressure 1,700 lbs. per sq. in.			
29	11.5	.0124	69
28	15	.0161	69
29	11	.0118	69
28	15	.0161	69
Load 100 lbs. Pressure 850 lbs. per sq. in.			
28	8.5	.0182	120
29	4.0	.0086	120
28	5.0	.0107	120
29	3.5	.0075	120

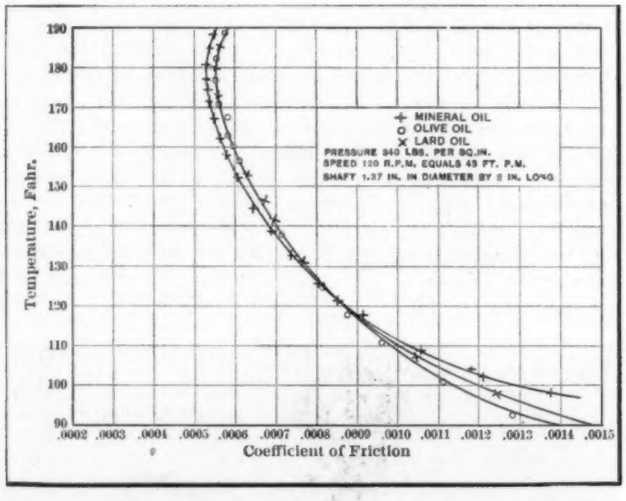

MINERAL OIL
OLIVE OIL
LARD OIL
PRESSURE 340 LBS. PER SQ.IN.
SPEED 120 R.P.M. EQUALS 49 FT. P.M.
SHAFT 1.97 IN. IN DIAMETER BY 2 IN. LONG
Temperature, Fahr.
Coefficient of Friction

Fig. 1—Result of test showing relation of friction to temperature

From the above record of tests, one may make the deduction that, while the coefficient varies with any one oil, the one effecting the greatest reduction in friction, as indicated by the resulting coefficient of friction, is readily selected and may be considered as having the greatest body. Thus, specimen 29, varied from a coefficient of friction of .0124 at 69 deg. F. and a 15 deg. angle, under a pressure of 1,700 lbs. per sq. in. to as low as .0075, at an angle of 3.5 deg. at 120 deg. F., and under 850 lbs. pressure per sq. in. This is a reduction of .0049, or nearly 40 per cent. Specimen 28, on the other hand, shows a total reduction of but 34 per cent, being consistently higher throughout the test by nearly 40 per cent. By comparison, then, number 29 is much the better oil to use. Not alone is this true under high pressure and low temperature, but also under lower pressures and much higher temperatures. The final saving, for instance, if it could be applied to the entire lubricating system of an automobile, from the engine bearings straight through to the axle bearings, would raise a brake horsepower at the wheels figure from say 25, a fair average, to 35. This, too, without any additional weight or other disadvantages. Body then, is of prime import.

The above tests bring out another important point, namely, that the product of the coefficient of friction and the pressure is practically a constant, so the total frictional resistance is not affected by a change of load on the bearing, because of the hyperbolic nature of the coefficient curve.

While much of the theory of lubrication, as to work done, heat generated, pressures, and many other quantities, is involved, it is not so involved but that it may be readily followed through by anyone deeply interested in the subject. Thus, considering a bearing having a radius r_1, a length l, turning at n revolutions, with a mean intensity of pressure p, distributed over an angle of rotation Θ, then the work done is:

$$\text{Work } U = 2\pi r_1^2 f p l n \Theta$$

In which, the additional quantities, not mentioned above are: f is the mean coefficient of friction, U is the work done in turning the shaft in the bearing through the angle Θ.

If there is no pressure from the bearing cap, Θ equals π and the equation assumes the form:

$$U = 2\pi^2 r_1^2 f p l n$$

Again, with a tight bearing cap, Θ may equal 2π, in which case the equation becomes:

$$U = 4\pi^2 r_1^2 f p l n$$

from which equations, the fact is deducible that with a fixed load, the intensity of pressure varies inversely with the area, so that the quantity $p l r_1 \Theta$ becomes a constant, and the work of friction and energy wasted become proportional to the diameter of the journal or shaft. Both of these are independent of the length, except as it effects the coefficient of friction. In that case:

$$U = 2\pi K$$

K being a readily determinable constant.

Since the heat due to friction is proportional to the work done,

$$H = \frac{U}{J}$$

in which, U represents the work done, and J, the mechanical equivalent of heat.

Now, in a perfectly lubricated bearing, a theoretical case but one which is closely approximated by a flooded bearing, in which an excess of oil is always present, the distribution of pressure is:

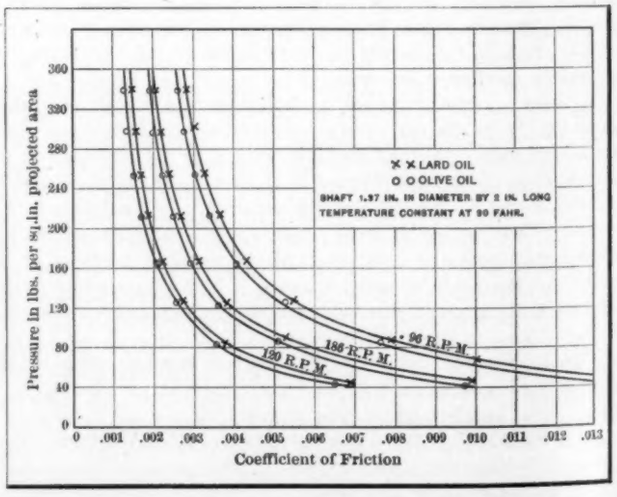


Fig. 2—Test curves showing how friction varies with pressure

$$N = p\,l\,r_1 d\,\Theta$$

and p equals N cos Θ
so that the load is:

$$\text{Load } W = \int p\,l\,r_1 \cos\,\Theta\,d\Theta$$

p varies greatly, but at intermediate points it is a constant, or enough so that it may be accurately measured. When so measured and introduced into the formula, the latter becomes:

$$W = p_1\,l\,r_1 \int \cos^2\Theta\,d\Theta$$

which is to be integrated between the two limits of Θ equal to

$$+\frac{\pi}{2} \text{ and } \Theta \text{ equals } -\frac{\pi}{2}$$

In any one element of the bearing, the total force of friction is shown by the equation:

$$f\,p = \frac{.64\,W\,\cos\,\Theta}{l\,r_1}$$

in which the normal variation is between the two extreme values for the angle. These values are cosine Θ equals zero, in which case, the angle is 90 deg., and for an angle of zero, in which event, the value of the cosine is a maximum at 1. In this latter case, the equation simplifies to:

$$f\,p_1 = \frac{.64\,W}{l\,r_1}$$

The total pressure on the bearing is then:

$$P_1 = .64\,W \int_{\Theta=-\frac{\pi}{2}}^{\Theta=+\frac{\pi}{2}} \cos\,\Theta\,d\Theta$$

$$= .64\,W\,(2\sin\frac{\pi}{2})$$

$$= 1.27\,W$$

from the above, the total force of friction is

$$f\,P' = 1.27\,f\,W$$

while the work of friction is

$$U = M\,a = 1.27\,f\,W\,a\,t\,r_1$$
$$= 2.5\,f\,n\,r_1\,t\,\pi\,W$$

In this, the new quantities introduced are: a is the angular velocity, t the time taken as a unit, n the number of revolutions in this unit time. By introducing the latter in the form of seconds, and thus, the British Thermal Unit, the total power lost is found from the form:

$$\frac{U}{550\,t} = \frac{2.5\,f\,n\,r_1\,\pi\,W}{550}$$

With uniform pressure over the surface of the bearing (a condition difficult to realize) the expression for the work of friction reduces to

$$U = M\,a = 1.57\,a\,f\,t\,r_1\,W$$
$$= \pi^2\,f\,n\,t\,r_1\,W$$
$$= 10\,f\,n\,t\,r_1\,W \text{ nearly}$$

That the fitting of the shaft to the bearing has a large influence upon the result is obvious, the exact difference being expressed by the difference between the values obtained from the preceding expression and the following. Before wear has widened the line of contact, and since $a = \Phi$ the angle of friction, the work of friction or energy wasted is:

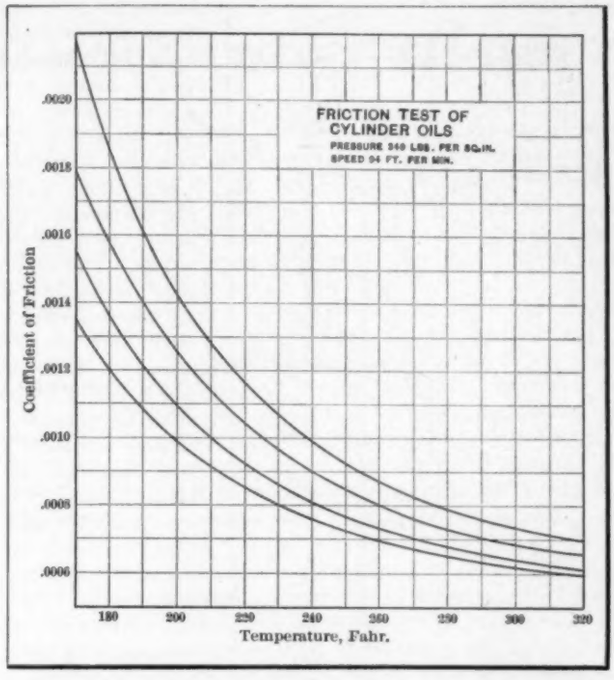


Fig. 3—Temperature variations in friction at slower speeds

$$U = W\,a\,t\,r_1 \sin\,\Phi$$
$$= \frac{f\,W\,a\,t\,r_1}{\sqrt{1+f^2}}$$
$$= 2\,W\,\pi\,n\,t\,r_1 \sin\,\Phi$$
$$= \frac{2\,W\,f\,n\,t\,r_1^2}{\sqrt{1+f^2}}$$

This form of shaft and bearing contact—that is, loose contact, but without wear—produces the least waste and is thus the most desirable. It is an ideal case, however, and when approached too closely, results in over-rapid wear, heating, and many other undesirable features. The ideal form, then, is not of a necessity the most practical one.

Apparent Influence of Temperature

Tests seem to show that with a decided rise in the temperature, there is an equally decided drop in the coefficient of fric-

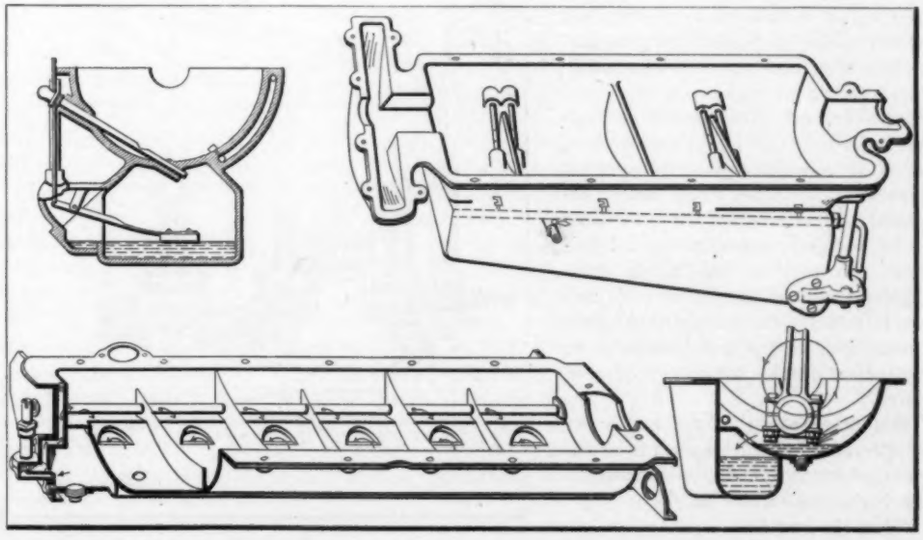


Fig. 4—Well worked out details of lubricating systems. Above, Columbia. Below, Oldsmobile

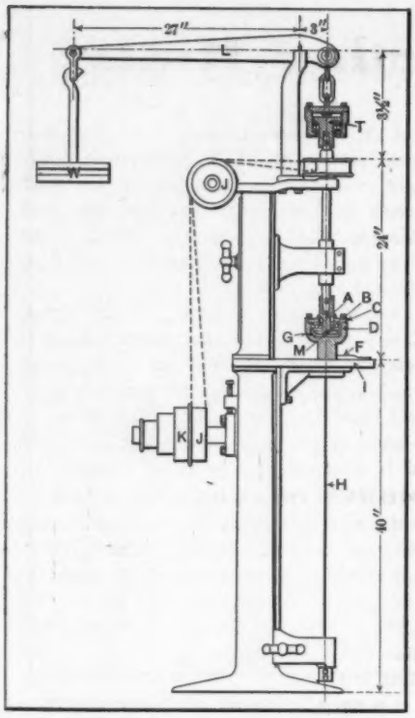


Fig. 5—Machine used in testing lubricants

tion—that is to say, from the point of view of maximum power output with minimum power input, using any one lubricant continuously, the higher the temperature the better the result.

This, however, soon reaches a critical temperature for each and every known lubricant, which critical point must be previously known, so that it may not be exceeded either purposely or by accident.

Everything said thus far has been in reference to one lubricant only, however, the results are somewhat changed when lubricants are mixed, even though of the same generic type. Thus, one test showed the following:

TEST OF SOLID LUBRICANTS FOR FRICTION AND PRESSURE

Lubricant	Speed in R.P.M.	Minimum Coeff. of Friction: Without Graphite	Minimum Coeff. of Friction: With Graphite	Maximum Allowable Press.: Without Graphite	Maximum Allowable Press.: With Graphite
Kerosene	300	.00180	.00090	290	380
"	475	.00185	.00140	290	470
"	700	.00225	.00156	290	470
Lard Oil	300	.00181	.00122	650	830
"	475	.00199	.00141	560	830
"	700	.00268	.00153	560	830
Vaseline	300	.00288	.00173	740	1100
"	475	.00280	.00210	830	920

This table shows a remarkable state of affairs. Not only is the already low coefficient of friction, in some cases so low as .00180, lowered very materially, but in some cases is actually bisected or cut in half, a reduction of 50 per cent. The last two columns of figures show items of equal importance with the friction coefficient, for the maximum allowable pressure is often of more importance than the actual saving of power. In this particular test, not only was the minimum saving as high as 30 per cent., but in several cases, it ran as high as 50 per cent. It would appear then, as if it were advisable to combine lubricants at times, this being effected with due regards for the work to be done, the necessity for a lubricant, the cost of the single components and of the compound, and the relation of the value of the lubricants, both singly and combined, to the value of the service to be rendered.

Referring again to the matter of temperature influence upon the coefficient of friction, attention is called to the high temperature work.

Thus the test made some years ago for a fire insurance company:

RESULT OF TEST SHOWING TEMPERATURE INFLUENCE
Unknown Mineral Oil, Pressure on surfaces constant at 33 lbs. per sq. in.

Temp. F.	Dynamometer Reading	Coefficient of Friction
35	8.00	.0485
40	6.12	.0371
45	5.68	.0344
50	5.36	.0325
55	5.12	.0310
60	4.95	.0300
65	4.75	.0288
70	4.54	.0275
75	4.37	.0265
80	4.29	.0260
81	4.27	.0260
82	4.25	.0260
83	4.25	.0260
84	4.28	.0260
85	4.31	.0261
90	4.90	.0297
95	6.10	.0370

Attention is called to the table above, which clearly shows that while a rising temperature is beneficial to the power saved, as exemplified by the coefficient of friction, it must also be watched with care, in order not to overtop the point of maximum saving, beyond which there is a sudden rise. Thus, while a rise of 35 deg. from 35 to 70 results in a drop in the friction from .0485 to .0275, a reduction or saving of 43.3 per cent, a further rise of but 15 deg. results in a further drop of but .0014 or less than 5 per cent. Not only that, but it brings the operation to the critical point so that a still further rise of the temperature of operation of 10 deg. results in a rise in the coefficient or loss of power of .0109, equal to 41.8 per cent, and almost overbalancing the former gain in 35 deg. rise. In short, this coefficient plotted as a curve, rises somewhat rapidly, has a rather flat top, and drops as suddenly as it rises, points at 40 deg. on the ascent and 95 deg. on the descent being practically on an equality, in fact, a consideration of these figures would seem to show that beyond the critical temperature, the drop is very rapid, much more so than the rise, rising as it does from a given point to a maximum in 42 deg. and dropping the same distance in 8 deg. Fortunately for the automobilist who must use the oils and greases, this critical temperature varies from one oil to another, very much between oils and greases, besides being different in other lubricants. Moreover, in the usual case, the range of difference is greater than in the case above selected for illustration of the point. Purely aside from the wider range, the oils and other lubricants used on automobiles have, generally speaking, a higher critical point than the one just illustrated.

(To be continued.)

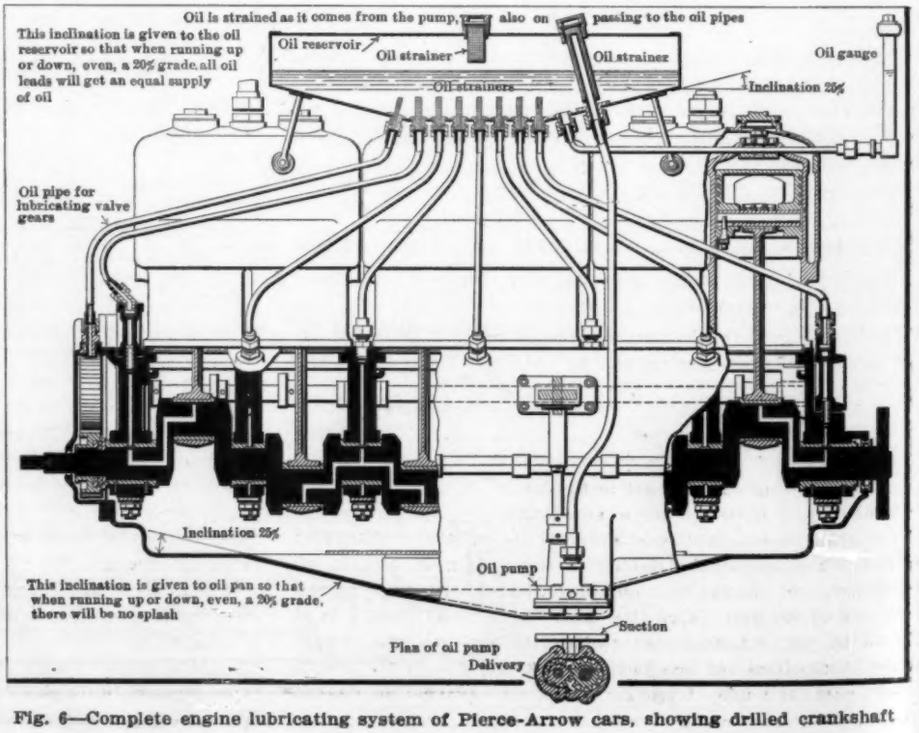

Oil is strained as it comes from the pump, and also on passing to the oil pipes
This inclination is given to the oil reservoir so that when running up or down, even, a 20% grade, all oil leads will get an equal supply of oil
Oil reservoir
Oil strainer
Oil strainer
Oil strainers
Oil gauge
Inclination 25%
Oil pipe for lubricating valve gears
Inclination 25%
Oil pump
This inclination is given to oil pan so that when running up or down, even, a 20% grade, there will be no splash
Suction
Plan of oil pump
Delivery

Fig. 6—Complete engine lubricating system of Pierce-Arrow cars, showing drilled crankshaft

In the Selection of a Car--Further Hints

WISDOM, if it is exercised during the process of selecting an automobile, will bear fruit in divers directions, the owner will become the possessor of a car which will reflect his needs, the service it will render might even exceed his most sanguine expectations, and the cost of maintenance will be low. If this latter condition holds, the life of the automobile will be relatively long, because a thing which does not have to be repaired at frequent intervals is bound to last the greater length of time. Wisdom is never more in evidence than it is when the automobile, as selected, is in precise accord with the service demands. It is in the process of selection that many inexperienced purchasers lay the foundation for future trouble and an increased measure of total cost. Buyers are too prone to lay undue stress upon a selling point.

STRESS USUALLY LAID ON WRONG POINT

For illustration, there is no gasoline car made which will supplant the electric in a certain field, and, as a far-fetched illustration, a banker would scarcely want to ride as freight in a five-ton truck from his office to the bank. The same idea crops out when any automobile is being selected; the right one will do the intended work, nor is a car valueless for its real work simply because it fails to satisfy a purchaser who makes the wrong selection.

It is too commonly true that intending purchasers lay stress upon the points which, while they are important, are not of the first importance. Take the location of valves: they may be (a) in the head, (b) both on one side; or, (c) as in T-cylinders, inlet on one side and exhaust on the other. Let it be taken for granted that this scheme of location is one to be weighed; certainly it is not a matter which should be compared on a basis of inferior *vice* superior material; bungling *vice* designing, or workmanship *vice* the haphazard effort of the novice.

An innovation must make good in service before it can be accepted as better than some tried device which will do the very work it is placed to do. When a purchaser places his money in hand of tried and true stability, no matter how it is clothed, it is a safe enterprise, and any other way of viewing the matter involves speculation, and the purchaser who takes this path becomes a speculator—there are good and unattractive speculations.

Speculation is legitimate within certain limits, but it is reckless when it is blind. None of the risks due to speculation are present in the mere process of selecting a motor which has the valves placed in the head, all on one side, or half on each side. Good designing will render the valves potent in either location, and, no matter where they are placed, if the materials and workmanship are inferior, the end will be disappointing.

SOME IMPORTANT CHANGES OF THE YEAR

In former times the crankcases were made of aluminum, which material was selected for lightness. The earlier efforts were attended by many a failure, due to the use of either inferior aluminum alloys or to lack of knowledge in the use of this material. The selections this year are as follows:

(a) Aluminum castings with arms of drop-forged steel.
(b) Aluminum castings with arms of the same cast integral.
(c) Cast iron upper half with aluminum for the lower half.
(d) Cast iron for upper and lower half.

Probably 50 per cent of all the crankcases made this year are of cast iron. Last year there were not more than 10 makes of motors which included cast iron in the crankcase, and, in all probability, this change in material represents the most radical departure of the year. Cast iron adds to the weight, but it is at a point of vantage, all things considered, and the total weight of the automobiles are less than ever before, due to the use of pressed steel and drop forgings instead of castings for chassis frame parts.

The engineering side of the automobile, then, in view of several advances, makes it good practice to add weight where it will count, and subtract weight elsewhere, to compensate for such additions. It is in this class of refinements that advances have been made, and it is on this account that some critics have visited the shows and brought away the idea that the automobile designing situation is more or less at a standstill.

There is no evidence of a standstill; designing is far ahead, and it is due to the industry to point out that improvement is now being made in directions which are too subtle to intercept the eye of the critic who depends for his information upon the fact that he is not color blind; it is not now a question of the color of the finish of the body or the shape of the hood, nor can criticism be well-founded if confined to superficial matters.

MOST FOR THE MONEY IS ANOTHER POINT

It is one thing to want the most capable automobile made, and quite another matter to demand the most for the money. If an intending purchaser cannot afford to expend more than a certain sum, his first move should be in the direction of eliminating from his mind the idea that he will exact all the high-priced gewgaws that hamper automobiles, in general, and learn to limit his wants to the automobile proper, and to be careful not to go in for an "elephant." It is a moral certainty that, with a certain amount of money, but a fixed amount of good machinery can be purchased.

In a general way the cost of maintenance of an automobile is in proportion to the square of the speed it will make on the road, and in order to keep down the speed it is necessary to limit the power of the motor. This is not to say that a relatively puny motor should be loaded down by a big if not overgrown chassis. Harmony of relations of power plant to car should be maintained.

Makers are frequently confronted by demands which spell large repair accounts by purchasers who hanker after express speed when they only show a willingness to pay for a "freighter," and the only way this demand can be met is to so gear the motor that it will propel the car at a relatively high speed on a hard, level road, with disastrous results which creep in from two sources:

(a) The motor is strained when a grade is being negotiated, or, if the going is heavy as in deep sand.

(b) The high speed on a level pounds the car to junk—it is not designed for such speeds; the tire equipment is below the requirement.

According to this method of reasoning, the speed laws which are complained of as being too stringent, are in exact accord with the natural laws which place a limit on excessive cost of maintenance, and the reasons why the speed law should be respected may be summed up as follows:

(a) Depreciation will be excessive if the speed of a car is increased beyond the point as indicated by the character of the material used in the makeup of its parts, as it may be if the purchaser demands a special gear ratio in order to enable him to make greater speed on a level than is consistent with the hill-climbing ability of the car, considering the power of the motor, and when high gear is being used on the hill.

(b) If a car is thus abused it will soon reach a state of bad repair which will render it unsafe from the point of view of the public at large, and it is fair law to protect the public at large from the acts of those who have no regard for safety for themselves or others.

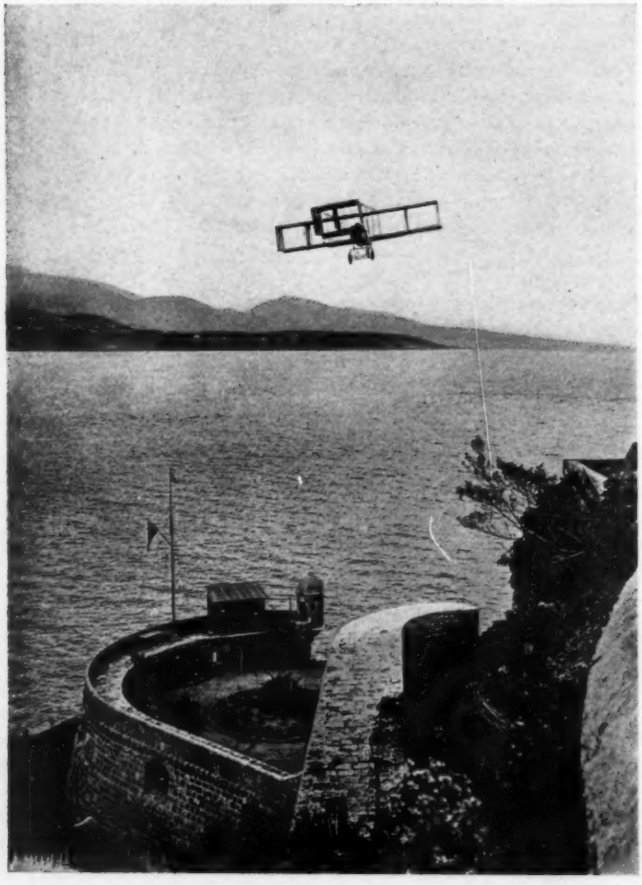
It is in these and many other ways that designers are paying attention to the problem, and it should be worth more than a little to prospective purchasers to appreciate this situation, especially when they go to select a car. Too much for the money is never to be regarded as a good purchase, and trying to beat the seller into a bargain state of mind is poor economy.

NEWS FROM BEYOND THE ATLANTIC

Rougier's Sensational Flight at Monaco

MONACO, March 14—Exactly one year ago valuable prizes were offered for flights from the port of Monaco to Cap Martin and return. The distance across the blue waters of the Mediterranean is only about three miles, but in view of the fact that there is hardly a level inch of ground on which to make a start, no aviator was found capable of winning the prize. The trip has now been made by Henri Rougier, a former automobile race driver, now a Voisin pilot, without the attraction of a big money prize. Rougier returned from the Egyptian meeting, had the big cases containing his aeroplane shipped to Monaco, occupied two days in fitting up the apparatus, then, after a dynamometer test of the motor, flew across the water.

The feature of the flight is that a start had to be made from a jetty 130 feet wide and 350 feet in length, with the harbor on the left, a perpendicular cliff on the right, and at the end a sea wall 35 feet high which must be cleared after this unusually short run. It is necessary to come back to the same place to make a landing, for this is the only level portion of this town nestled in clefts of the rock. In order to prevent aeroplanes and their pilots dashing themselves to pieces against the sea wall, the Monaco committee last year built a steeply inclined plank road from the jetty to the top of the wall, the inclination being so great that unless an aeroplane had got sufficient lift to clear the wall it would in all probability be brought to a stop without damage being done.



Picturesque but Dangerous Setting of Rougier's Flight

This track has remained in position, but was not used by Rougier, for immediately full gas was given to his motor he shot away, rose quickly, cleared the wall, and in a few seconds was hovering at a great height over the sea. Cap Martin having been rounded, the return was commenced. The aeroplane flew over the Tir aux Pigeons, now black with spectators. It appeared but a stone's throw to the harbor below, but in order to reach that narrow ledge it was necessary for Rougier to swing out to sea, then head in again parallel with the cliffs and the path. A landing was made in correct style, the machine pulling up after a run of only 100 yards. The trip had occupied a quarter of an hour.

Paris Show Settled by Club's Withdrawal

PARIS, March 14—After one month's hard fighting, the Automobile Club of France has been forced to give way before the combined constructors and withdraw entirely from the show business. According to an agreement which has just been arrived at, the next Paris Salon will be held by three automobile manufacturers' associations and one cycle makers' syndicate, under the patronage of the club, and with Baron de Zuylen, president of the club, as honorary president of the joint committee. For the first time in eleven years the Automobile Club of France will have no voice in the management of the show.

The authorities now responsible for the automobile exhibition in the Grand Palais are the Syndicate of Automobile Constructors, with M. Peugeot as president; the Automobile Syndicate, an affiliate of the Automobile Club of France, with Marquis de Dion at its head; the Cycle and Automobile Syndicate, presided by M. Darracq; and the Syndicate of Cycle Manufacturers. The three automobile bodies will each take 30 per cent. of the net profits of the show, leaving 10 per cent. for the cycle makers. By reason of this agreement, the understanding between the Syndicate of Automobile Constructors and the aeroplane manufacturers for the holding of a joint show, has been withdrawn. The aeronautical men will now hold their own show in the Grand Palais during the last fortnight of October, and the united automobile salon will take place in the same hall the first fortnight in December.

The new committee will inaugurate numerous changes in the method of holding the show. Gustave Rives, the genius of the fairy-like exhibitions which came to an end in 1908, has been asked to withdraw, and his place has been taken by M. Gobron, a manager who will have to work on more economical lines. It is the intention of the manufacturers to hold an important exhibition, for the feeling is strong that an effort must be made to put Paris back into the premier position as an automobile center. At the same time there must be no unnecessary expenditure on decoration for decoration's sake. Stands will doubtless be of a uniform type throughout, provided complete, ready for receiving the exhibits, at an inclusive cost. There will be drawing of lots for positions, but not on the previous basis of first reserving the central stands for the oldest established or the most important racing firms. Everybody will now be treated alike. It is very probable, too, that the show will only remain open twelve days instead of three weeks, as formerly.

There is a strong feeling that government influence has been brought to bear on the various parties in order to lead to this settlement of the difficulty. The club protested against the aero manufacturers receiving the automobile industry into their ex-

hibition, and the automobile firms, on the other hand, maintained that they were ready to work with the club if reasonable terms were put forth. As the government gives the use of the Grand Palais gratuitously, it was an easy matter to give a hint to the aeronautical group that the hall was not loaned for a joint show, and at the same time advise the club that it had engaged upon a useless struggle in trying to fight the automobile manufacturers. As the club, however, had an option on the Grand Palais, and the manufacturers had not, it was only possible to hold the show by giving that body a nominal share in it. This was done by asking the club to patronize the show and put its president, Baron de Zuylen, in the position of honorary president.

Paris Omnibus Company Renews Monopoly

PARIS, March 14—The only automobile firm in Paris which has reason to be satisfied with the recent floods is the company holding the monopoly for the motorbus service. During the height of the flood most of the trolley cars were stopped, the entire subway service was put out of commission, and even now, when there is not a single flooded street in Paris, only about one-tenth of the underground lines are in service. This was the opportunity of the bus company, for, as its garages were on high ground, no damage could possibly be done to the vehicles, and if streets were flooded it had only to change its routes to those that were free of water. The subway having disappeared as a competitor, it has been possible to run lines that were formerly unprofitable with very great advantage. There is, indeed, such a demand for buses that the company has been obliged to appeal to all automobile manufacturers who have previously produced experimental buses to loan them for the present occasion.

On the Hotel de Ville-Porte Maillot line a most miscellaneous collection of power buses is to be seen. The group comprises the standard four-cylinder Eugène Brillié, Darracq-Serpollet steamers, Renaults, De Dion, Diétrich, Brasier front-drive, Clément-Bayard and Darracq gasoline motors. The same additions have been made in other portions of the city formerly served by the subway, and in every case the buses are incapable of taking all the passengers presenting themselves. As the omnibus company had in stock large quantities of gasoline and benzol it has not had to pay the extra price for fuel that has struck taxicab drivers and private hiring firms so hard.

On June 1 the monopoly of the present General Omnibus Company in Paris will expire, and on the same day a new monopoly for forty years will be entered upon by the same body. The city, however, will have the right to purchase the undertaking at the end of ten years if considered desirable. The new order of things will see the introduction of an all-mechanical service for Paris, one of the conditions of the new contract being that the horses still remaining in service shall be withdrawn as quickly as possible and their place taken by gasoline or steam vehicles. Starting from June, 1910, three years are given in which to abolish all the horses, at the rate of not less than 200 reformed vehicles a year.

The present buses in service are two-deckers driven by four-cylinder Eugène Brillié motors running on benzol. It has been decided that the upper deck shall be abolished, and that the new buses shall have a capacity for not less than 34 passengers. This change has been expected for some time, it being felt that the present buses were too large and heavy for the most efficient service. Dwellers along the routes strongly protest against the noise and vibration which the vehicles occasion. The company is free to buy its buses wherever it desires, but must submit them to a municipal examining board before putting them into circulation. Up to the present the only specially-designed single-deck buses that have been used in Paris are four-cylinder Renaults, the first of which were mounted on triple rear pneumatic tires and twin pneumatics in front. Recently the same buses have been run with solid rubber tires in the rear and pneumatics in front. A number of the two-deckers have been converted to single-deckers, but as they are too narrow in the track and are unnecessarily heavy for the reduced load they have not been a success. Attempts have also been made to utilize old horse material by fitting a front drive.

Rougier in Full Flight over Ships in Monaco Harbor

Automobile manufacturers are anxious to get hold of the omnibus company's contracts, for the new regulations practically stipulating that all the present vehicles, whether horse or mechanically driven, shall be replaced within a limited period, there will be over one thousand new autobuses to furnish. Motors using alcohol or benzol will probably be favored, as the Paris tax makes gasoline too expensive for profitable working.

Santos Monoplanes Under Construction in Clement Factory

Motley Assemblage of Buses Waiting at Paris "Luna Park"

Graphite, What It Is, Where Found, and How Used

NOWADAYS the necessity for proper lubrication is being appreciated at its full worth, and in the automobile business is having its proper result, this being apparent in greater mileages per given weight or quantity of fuel, increased life of mechanisms, lessened care, lowered repair bills, and in many other ways. With this idea in view, a short mention of some of the more important lubricants will be of interest.

Graphite exists in two forms—crystalline (or flake) and amorphous. It is known to the trade by the names of black lead, plumbago and graphite. Black lead usually refers to the inferior grades of graphite, plumbago to the Ceylon product, and graphite to the American product.

A distinguishing characteristic of graphite is its unctuous quality, and all graphites have this quality, the crystalline more so than the amorphous forms for the reason that when a crystal of graphite is broken the cleavage surface is smooth, while in the case of amorphous graphite, and because it is amorphous, the line of the fracture is necessarily irregular and rough. It is only when the irregularities are worn away that such a surface becomes smooth and unctuous.

This quality (unctuousness) is usually determined by rubbing between the thumb and finger. However, this method does not give entirely satisfactory results for reasons as follows:

Crystalline graphite, either flake, needle-like or irregular, is dense and compact, and not easily reduced by crushing between the fingers, so that the individual particles maintain their size and continue to be easily felt; while, on the other hand, the amorphous kinds of graphite, both natural and artificial, continue to be reduced in size until the particles no longer are evident to the touch, and the "unctuous" sensation comes into evidence.

A true lubricant has been described by some of the promoters of the suspension of graphite in oil as "a body that will subdivide so that all movement will be within itself and not between it and the adjacent metal"; also that a perfect suspension of graphite and oil "is of a nature that permits of slipping within its own mass without any expenditure of energy that will produce high temperature."

The close connection of the definition of a perfect lubricant and the mention of graphite as possessing the qualities of a perfect lubricant are deceptive. This definition of a true lubricant is a very excellent one, and describes perfectly a liquid or semi-liquid substance where the material adheres to both friction surfaces and the globules between are in constant movement one on the other, but no stretch of our imagination can enable us to conceive such a condition when considering graphite, which is a solid substance and which requires considerable force to rend the particles asunder.

A mixture, as indicated above, of graphite suspended in oil has no particular advantage over a non-graphited oil as a lubricating material, because the particles of graphite, being in perfect suspension, cannot break through the surrounding film of oil or easily become attached to the metal surfaces. They simply move about in the oil film without at all decreasing the viscosity of the oil itself, the only way in which any reduction of friction could be brought about. In fact, a mixture of finely divided graphite and oil has a higher viscosity than that of oil alone, and so reduction of friction is not to be sought along this line.

One of the real functions of graphite as a lubricant is to keep the metallic surfaces apart. This result would be obtained by the presence of any solid material, such as sand, carborundum, or any abrasive substance, but that these have no value as lubricants is obvious. The separating substance, in addition to keeping the surfaces apart, must not in any way detract from the smooth, frictional surfaces, and, on the other hand, must make them smooth when they are rough. Graphite fulfils these requirements, provided it becomes permanently attached to the surfaces. A reasonable doubt might be entertained as to whether graphite can readily become attached to the frictional surface if it is so fine that it passes through the pores of filter paper, as is claimed (by some), which would indicate that the particles of graphite are surrounded by an unbreakable oil film. But if these particles could become attached to the frictional surface, efficient but not lasting aid to lubrication would certainly result.

As was said, amorphous graphites are extremely friable and easily worn away.

"Place a very little amorphous graphite on the palm of the hand and rub with the finger and notice that it cannot be rubbed off." The above has been cited as an evidence of the adhesiveness of amorphous graphite, but go a little farther: wash and dry the finger between repeated rubbings, and it will soon be noticed that the finger slides over the palm with difficulty, though the graphite still appears to be there. Now, what has happened? Simply that the graphite, being so friable, has all been worn off the high points, while enough remains in the depressions to give the idea that it is all there. The very fact that the rubbing finger continues to get blackened between washings shows how easily the amorphous graphite wears away.

Now place some crystalline graphite, preferably in some flake form, in the hand and repeat the experiment, and note how much less rapidly it blackens the rubbing finger.

In all friction surfaces there are irregularities both above and below the normal surfaces. It is the irregularities above the normal that cause the trouble, and it is important that whatever surfacing material is used should be able to build up the surfaces to the level of high points, rather than to simply fill up the very minute pores of the metal. It is not conceivable that any particle of graphite small enough to go through a filter paper could become impaled on one of these projecting peaks, but such a result is entirely possible when the broad flake is used. Even on smooth surfaces the flake form of graphite adheres with wonderful persistence, and its resistance to wear, due to its smooth crystalline surface and compaction, is remarkable.

Every one knows how difficult it is to sweep up a small, flat piece of paper, like confetti, from the floor, and the same reasons which cause the paper to adhere to the floor cause the flake of graphite to adhere to the surface of the bearing which it is intended to lubricate.

Standardization Talk Universal, Nowadays

SO much is being said nowadays about standardization, and its possible working out in the near or more remote future, that anything said on the subject is pertinent. In a recent issue of the *Motor Trader* (English) the following remarks were made under the caption "Standardization as a National Essential":

"A lecture by the president of the Engineering Standards' Committee—Sir J. Wolfe Barry, K.C.B., etc.—recently delivered before the Institution of Engineers and Shipbuilders of Scotland, will aptly serve to again voice the necessity for attention to standardization in the motor trade, perhaps the greater need of the day when its financial condition furnishes the uppermost problem. The fact that this subject is being so persistently pre-

sented to and discussed by the older branches of the engineering trades, those branches, too, that have subordinated the elements of design to the absolute requirements of commercial economy combined with efficiency to the user, is some indication that the ultimate trend of any branch of trade concerned with a mechanical output must make for standardization as a business necessity if not an inventor's ideal. As the author pointed out, standards exist for art and literature and as a means for assessing the every day economies of life. Without our weights and measures' standards, imperfect though they be, business could not be conducted, for it is of their essence that they control the sale and exchange of a variety of commodities. The appreciation of some such purpose of a systematized production has been rife in the mechanical industry as a whole since 1841, when Sir Jos. Whitworth introduced his standards of screw threads. It is true that for several years the ideal thus epitomized was overlaid by the prosperity of the industry which with the world for its mart had no pressing reason for producing by a system of uniformity or standards, and rather courted diversity of practice as the more evidence of a trade expansion that then seemed almost illimitable. With the altered conditions of modern trading, partly brought about by the supplanting of hand-wrought processes by machine and repetition methods of manufacture, and even more so by the greater diversity of the quarters whence they emanate, uniformity of parts' measurements and to a degree of the bare essentials of design became a necessity of commerce rather than as at the earlier period an ideal of the far-seeing organizer. The now stable position of the standardization movement is but of recent attaining. The success attending it has been great, but the efforts of the committees of organizers and of the sections of trade intimately concerned with the task of collating the evidence and suggestions of their members have been vastly greater. Reference to the reports of these sections, or at least such as have some relation to the industry, has been made in these columns periodically. It is to be feared, however, that the motor trade is as little alive to the importance of standards for the essentials of chassis as to some other factors making for the internal economy of the trade. Sir J. Wolfe Barry's paper furnishes numerous illustrations of the appreciation of the engineering trades of the efforts of himself and colleagues, but none that the motor car branch has at all risen to the demand. It is not so in France, the trade's greatest competitor. There standardization exists and with it no lack of progress in design, but the designer first lays hold of what is available cheaply by organized repetition methods and fashions his ideal so as best to comprehend as much of them as can be availed of. The experience of all modern manufacture is entirely against an unrestricted scope to the designer, or, to put it alternatively, the merit of a successful mechanical product is in the cheapness with which it can be made, maintained, or its parts replaced. There is no restriction of merit or talent in this environment, and no limitation of the trade's commercial scope of activity. The public demand for diversity in style and to a degree as regards essentials can truly be more adequately satisfied by a production based on a large output of many parts organically units, and structurally similar, than on a system that necessitates as many drawings, fixtures, and an administration that must consume most of the available profit.

Further Possibilities of Standardization

CONSIDERING standardization as a factor in reducing cost, it is strange that designers are not more alive to the possibilities of incorporating into their designs standard measurements for connecting rods, front axles, and other drop-forged parts in which the cost of the dies is important. Although the making of pressed steel frames is the monopoly of a comparatively small number of firms, and the variations in pattern are correspondingly limited, hardly any two designers seem agreed as to the shape of the front axle beam, and each requires separate dies. Such procedure should not continue in a business ostensibly commercially conducted.

Another point suggested by the recent show exhibits is the prevalence of the stereotyped in erroneous design. Such was to be noticed perhaps more in regard of the steering gear of certain chass's that are claimed to have been "specially designed." The trade has accepted the behind-the-axle position for the bar, and for reasons that certainly have more sanction from the aspect of safety in the event of a collision between the dumb ends of the frame, than for any mechanical point of superiority; yet few constructors have been able to break away from the necessarily hazardous (under vibration and wear) ball-and-socket coupling for the steering link, and a still larger number seem unagreed as to the relative efficiency of the angle, or the direction of the rake of the link member. The style of constructing the pivot or axle stub centers is also unsettled, and the wisdom of getting the road wheels as closely up to the pivot centre as is possible with a shoulder pivot arm does not apparently find agreement with all constructors.

Outside the mechanical purview has to be noted with much gratitude a wider recognition of the carburetion problem. The combination of a mechanical—as distinguished from any species of automatic-spring control—means of synchronizing the flow of the liquid fuel, and of determining mechanically its volume for a given position of throttle opening seems to have commended itself to a number of students of the question, and in combination with the now accepted practice of separating the jet and primary air intake from the extra air valve, with a (heat) jacketed vaporizing chamber or trunk pipe, promises to prove no small factor towards a more economical fuel consumption. The trade should have available for such tests a suitably equipped laboratory to further the tests in this regard, and that even more important aspect of the fuel question, the garnering of data on the merits and possibilities of alternative fuels within the capacity of the country to produce. The trade has certainly available the researches of specialists in laboratories subsidized from the public funds, but such are controlled by a management necessarily independent of trade control. Hence such research work has a pedagogic or academical rather than a practical and experimental value to the trade, and results in the forcing back on their own resources the trade's own witnesses to progress and research.

Simple Formula for Welding Cast Iron

A formula for welding cast iron, developed by Messrs. A. Beltzer and C. Delcampe and published in the *Iron and Coal Trade Review*, calls for a flux consisting of 15 per cent. lithium chloride, 20 per cent. potassium fluoride and 60 per cent. potassium chloride. The cast iron surfaces to be welded are preheated, and then covered with the flux powder and heated to the melting point. Additional material is supplied from a rod of cast iron which is also dipped in the flux and presented to the joint where it melts and flows in, filling up the space and making a sound weld. It is claimed that blow-holes in castings may be filled by the addition of cast iron in the above manner and that metal may be added to defective castings to build them up where defective. In short, this can be made a "putting on" process where required. The means for heating are not given, but probably any non-oxidizing flame capable of raising the temperature to the melting point of cast iron can be employed.

Results from Testing Napthalene

NOT so very long ago, about seven months ago to be exact, there was a very spirited discussion in these columns as to the availability and general usefulness of other fuels than gasoline to automobile work, the particular cause of the discussion being some statements made concerning napthalene. This fuel, which comes in a solid state, was discussed pro and con for several issues.

However little or any of what was said then was said with a basis of actual test results. So, it is of use to present some exact figures and comment thereon, as sent out by a foreign correspondent, writing with the consent of the Technical Commission of the Automobile Club of France, which made the tests.

The results of this exacting trial were very much in favor of napthalene and it will therefore be of interest to know a little more about this fuel. The Assistant Secretary of the Technical Commission, M. L. Ventou-Duclaux, an expert chemist, has given us the following interesting details:

The use of napthalene as fuel for internal explosion motors—suggested as it was by the cheapness of this product (about $1.00 to $1.25 per 100 lb.) as compared with the costs of gasoline (about $5.00 for the same quantity)—offers several great difficulties which are in the nature of the product, and which the motor industry is trying now to overcome.

Napthalene is a hydro-carbon, and, like benzol and other different products, is extracted from heavy oils, which, in their turn, are distilled from coal tar, a residue of the production of coke and gas. The portions of these oils, which are distillated between 200 and 220 deg. (C.), are submitted to a cooling effect which causes the crystallization of the raw napthalene.

This latter is subsequently separated from the other products of the distillation by compression between sheets of tissue, in which way the liquids are separated from the solid matter. The napthalene is then purified by a treatment, with soda, which cleanses it from the phenols, afterwards it is treated by means of sulphuric acid, which separates it from the other basic substances. The napthalene is in the gas works rather a troublesome by-product, requiring frequent removal from the pipes, which it would otherwise obstruct in no time.

Until comparatively recently napthalene has only been used for preserving clothes against moths during the Summer. The development of the automobile industry has drawn attention to this valuable by-product, which, chemically, fulfils all the requirements of a suitable fuel for motor cars.

Napthalene, like gasoline, belongs to the aromatic group of organic compounds. The chemical formula describing it is $C_{10}H_8$ and belongs to the hydro-carbon group characterized by the formula C_nH_{2n-12}, while gasoline, whose formula is C_6H_6 belongs to the category C_nH_{2n-6}. The molecular percentage of carbon is greater with napthalene (93.7 per cent.) than with petrol (92.3 per cent.); and it may be stated as a general rule, that the larger the quantity of carbon the greater is the difficulty to burn it completely. As an example the methane C_4H may be given, which burns very easily, producing thereby carbon dioxide with water and steam, while petrol burns in the open air with a dusky flame, leaving a deposit of unburnt carbon. The napthalene burns under the same conditions, but with a very sooty and more heavy flame, which is a point to be recognized in dealing with it in practice.

To burn a gramme of napthalene in the chemical sense of the word—that is to say that all the carbon is to be transformed in carbon dioxide—about the same quantity of air is needed as for the same quantity of benzine. The combustion theory is quite easily established for the two products:

C_6H_6	+	15 O	=	$6\,CO_2$	+	$3\,H_2O$
78 gr. gasoline	+	240 gr. oxygen	=	264 gr. carbon-dioxide	+	54 gr. water
$C_{10}H_8$	+	24 O	=	$10\,CO_2$	+	$4\,H_2O$
128 gr. napthalene	+	284 gr. oxygen	=	440 gr. carbon-dioxide	+	72 gr. water

The Economy of Napthalene as a Fuel

A simple calculation will show that to burn 1 gramme of petrol, 3 grammes of oxygen or 13.04 of air are required, while the oxygen required to burn 1 gramme of napthalene is 3.07 grammes, which equals 13.34 of air. It is, nevertheless, also true that the same quantity of air will enable us to burn less easily napthalene than petrol, and to explain this it may be assumed that the carbon of the petrol has some peculiarities which are apparently not shared by that of the napthalene. On the other hand, the napthalene is a solid product at ordinary temperatures; its melting point is at 49.2 deg., while it boils only at 218 deg. To obtain the carburation of the air it is therefore necessary to vaporize the product, or at least to mix it in a liquid state with air while it is maintained at a temperature which does not allow it to vaporize. According to the tests made by Messrs. Burlat Frères, to ensure good results this temperature must not be lower than 200 deg. C. This temperature must, therefore, be reached before the motor is ready to accept napthalene as fuel, which renders imperative the starting of the engine on another fuel.

A by-pass branched off the exhaust will readily provide the heat required for melting napthalene; but it is also necessary that the pipes leading to the napthalene tank be always heated to at least 80 deg. C. If this degree of heating is not constant the crystallization of the fuel may take place, followed by stopping of the motor. The air absorbed for carburation must also be preheated before it comes in contact with the napthalene, and the admission of the air into the carbureter must be regulated with much greater accuracy than for a petrol motor, since the slightest diminution of oxygen in the mixture will cause a bad combustion of the fuel.

These conditions make the use of napthalene a delicate business, especially if it is intended to obtain from the fuel all the power it can give. Its non-inflammability when cold, the ease of handling, together with the cheapness in price, make it on the other hand a desirable product which should give excellent results if rationally employed. Why gasoline with 11,000 calories, and napthalene with only 9,620 calories, give the same power in an internal combustion motor has not yet been explained; it would be both useful and interesting to further inquire into this point.

To feed an explosion motor with a mixture of gasoline and napthalene should allow regular working under normal conditions, while realizing a great economy, especially under the existing prices of the two combustibles. The question of adopting the two, one for another, will have to be studied seriously, because it will not be easy to accommodate the new fuel to the conditions of the others, or it will have become possible to change the nature of carbon.

Now that gasoline is getting scarce, and the price—already high—being liable to go higher, the attention of all discerning automobilists who give the future a thought, is called to the above. Not only does this represent one angle of the fuel situation, and an important one at that, but it also shows that scientists are fully aware of the closely approaching end of the supply of available gasoline for an automobile fuel.

New Oscillating Engine Valve

VALVES have aroused much interest in the past year or so, primarily through the wonderful success of the Knight engine with sliding sleeve valves. Many inventors have brought out other forms of valves, possessing points of apparent superiority over either the sleeve form or the old style poppet valve, or both. One of the newest inventions in this line is that pictured on this page in several cuts, and the invention of M. S. Keyes, an automobile engineer, formerly with the Maxwell Briscoe factory at Tarrytown, N. Y.

As Figs. 1 and 2 on this page show, this invention consists of a tubular sleeve used for a valve. This sleeve has cut into its one side a number of ports, which are presented to the open combustion chamber in succession. To operate the valves—for there are but one per cylinder—the regular camshaft is used, but instead of a sliding or lifting motion, as in the case of the poppet valve, or a rotary motion as in some valves, the motion given to these sleeves is that of partial rotation followed by similar partial rotation in the opposite direction, in short, oscillation.

As Fig. 3 shows, this is accomplished from the usual camshaft by means of an L-shaped lever placed on the side of the head—for these valves are located in the head—and operated by the upper end of the push rod, this motion being restrained, and the downward motion produced by means of a strong spring, which works against the other end of the L-shaped arm, and at right angles to the direction of the push rod.

Inflow of gases and outflow of the exhaust are through the interior of the tubular form, the inlet and exhaust pipes being bolted up to the cylinder heads on the side opposite to the operation. This gives a certain amount of end thrust on the valve, both from the inflowing carbureted air and the reaction from the fast-flowing exhaust. This is cared for, as is also wear, by means of a taper end.

To take care of unequal expansion and contraction, the side of the sleeve opposite to the ports is slotted with a fine slot, which allows the valve to adjust itself to the temperature of the surrounding chamber. This slit is made large in the drawing to bring out the point. Similarly, the opening in Fig. 1 connecting

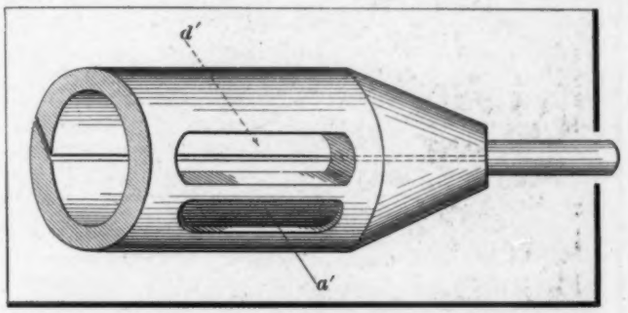


Fig. 2—Sketch of valve showing ports cut in the side

the port in the valve with the combustion chamber, is sectioned by mistake. This should show an opening, as the valve is set in the open position.

One advantage which this design has is that of calling for water jackets all around the valve, not alone below, as is common, but also above and on all sides, so as to completely surround the valve. This circular form makes this easy, without destroying the symmetrical appearance of the cylinder head. The latter is in a separate piece and bolted in position, so that removing it for an inspection of the valves, should one desire to do this, is an easy matter. To carry out the idea of a perfect combustion chamber, at least as to shape, the piston is hollowed down to a spherical shape, the part of the chamber which is in the head being similarly shaped. This form, according to scientists, gives the most nearly perfect results.

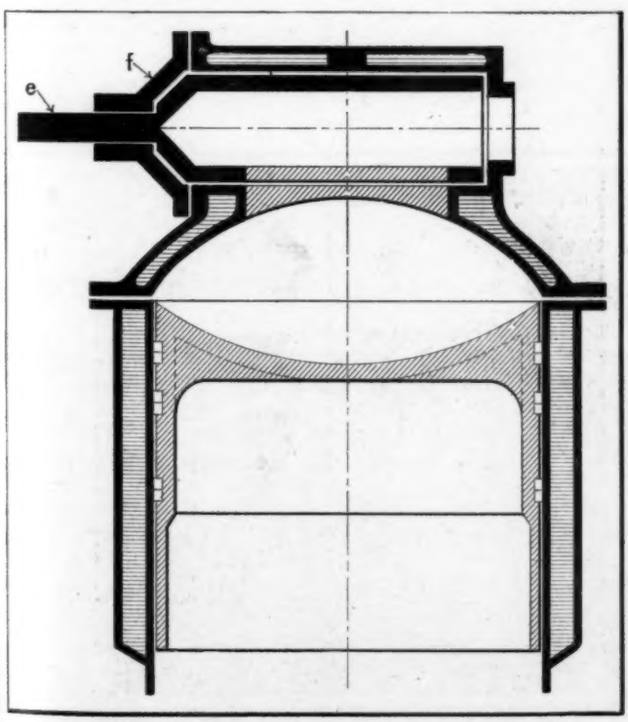


Fig. 1—Section through cylinder showing valve in place

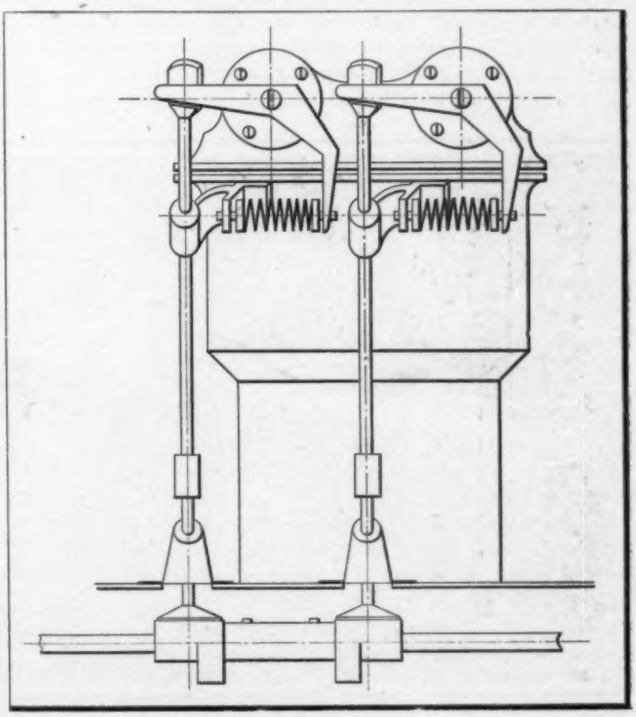
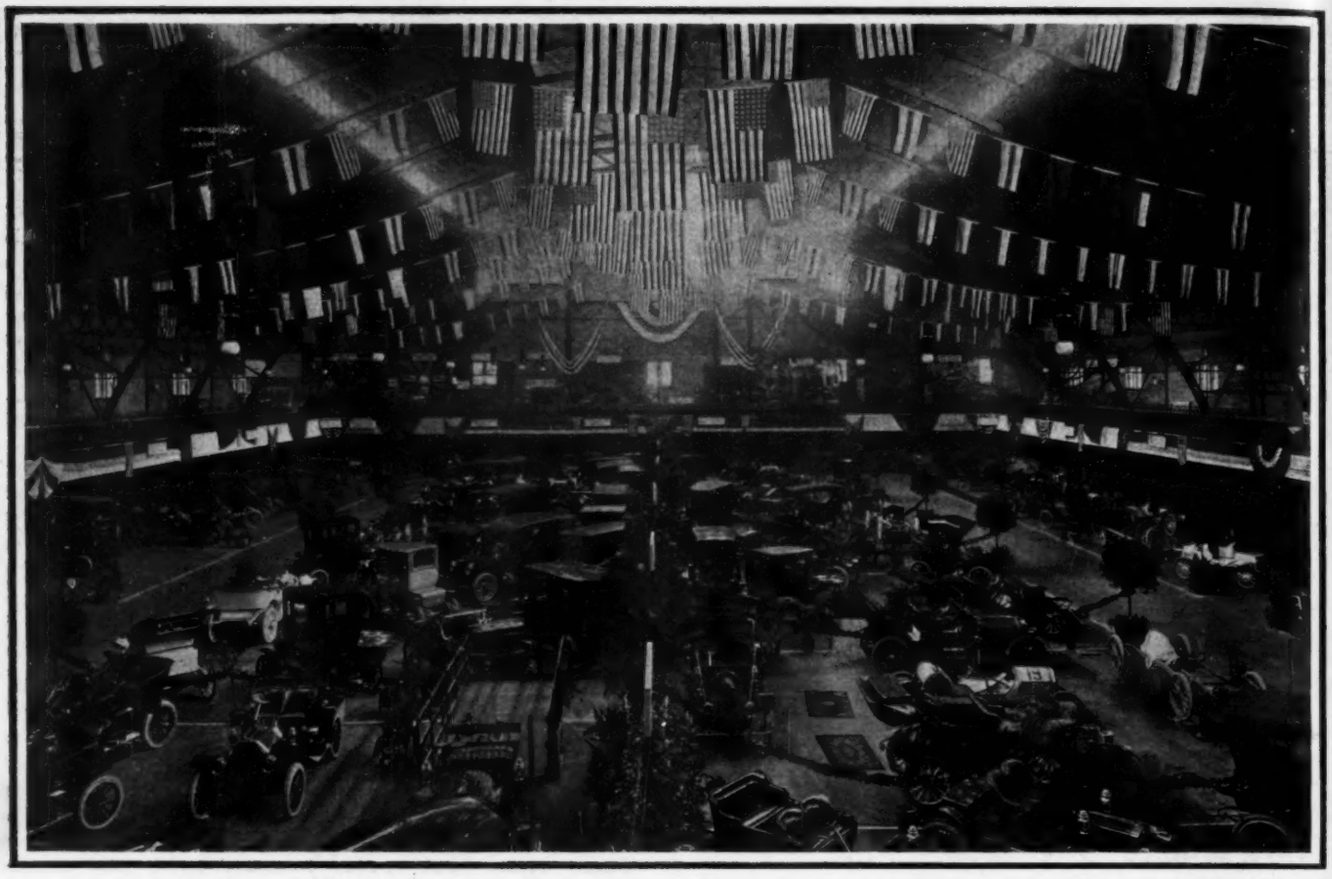


Fig. 3—Assembly of engine fitted with valve mechanism



General View of First Regiment Armory, Louisville, Showing Patriotic Scheme of Decoration, Using American Flags

Louisville Show Opens Under Auspicious Conditions

LOUISVILLE, March 22—The Automobile Show which was opened on March 17, and was run under the auspices of the Louisville Automobile Dealers' Association, closed on Saturday night under conditions of the most unusual success from both a business and social point of view. The excellent results obtained were due to the splendid co-operation of the members of the club as a whole, the close attention to detail by the committee, and the exacting and painstaking efforts of President Prince Wells, supplemented by the good work of Vice-President E. G. Reimers, and the executive ability and indefatigable energy of Herbert Levy, secretary-treasurer.

The opening took place at 1 o'oclock in the afternoon at the First Regiment Armory, which was appropriately decorated for the purpose, utilizing the flags of all nations in graceful array, and just enough of foliage to destroy monotonous tendencies. The armory is a large one, with 54,000 square feet of floor

Some of the Exhibitors. At the Left Weber Commercial, White and Stanley. Right, Buick and Welch Stands

Along one of the Outer Aisles, Where Chalmers, Reo, Haynes, Babcock, Ohio, and Broc Drew and Held the Crowd

space in the main hall, which is known as the drill room, and 18,000 square feet of balcony space. Over 100 cars were skillfully arranged over the drill room floor, and the balcony space was adequately cared for by the accessory makers.

From a purely business point of view the show exhibited some decided tendencies in addition to the customary expectation from the touring car point of view. It soon became known among the exhibitors that the South is interested in the commercial automobile, and the visitors from afar, representing in the main the rural communities, were there in sufficient numbers to be distinctly noticeable, and their inquiries took on a utility tone. There was no time during the show when it could be claimed that the Exhibition Hall was sparse of spectators, but there were periods during which the patrons of the industry were uncomfortably numerous.

EXHIBITORS AT LOUISVILLE AUTOMOBILE SHOW

Atlas Machine Company, Regal "30," Marmon, Empire "20," Grabowsky trucks; Banks Motorcar Company, Ford; Hite D. Bowman, Stearns, Rausch & Lang electrics; Broadway Auto Company, Stein tires and sundries; Andrew Cowan & Company, sundries; R. L. Davis, R. S. motorcycles; Dunham Auto Company, Velie "40" Buffalo trucks; Filton-Conway Company, E-M-F "30," Flanders "20"; C. W. Fisher, Thor motorcycles; Glossbrenner Commercial

(*Concluded on page 616.*)

Diagonal View of the Main Floor at Louisville, Showing Where Olds, Oakland, Rambler, Packard, Detroit and Woods Held Forth

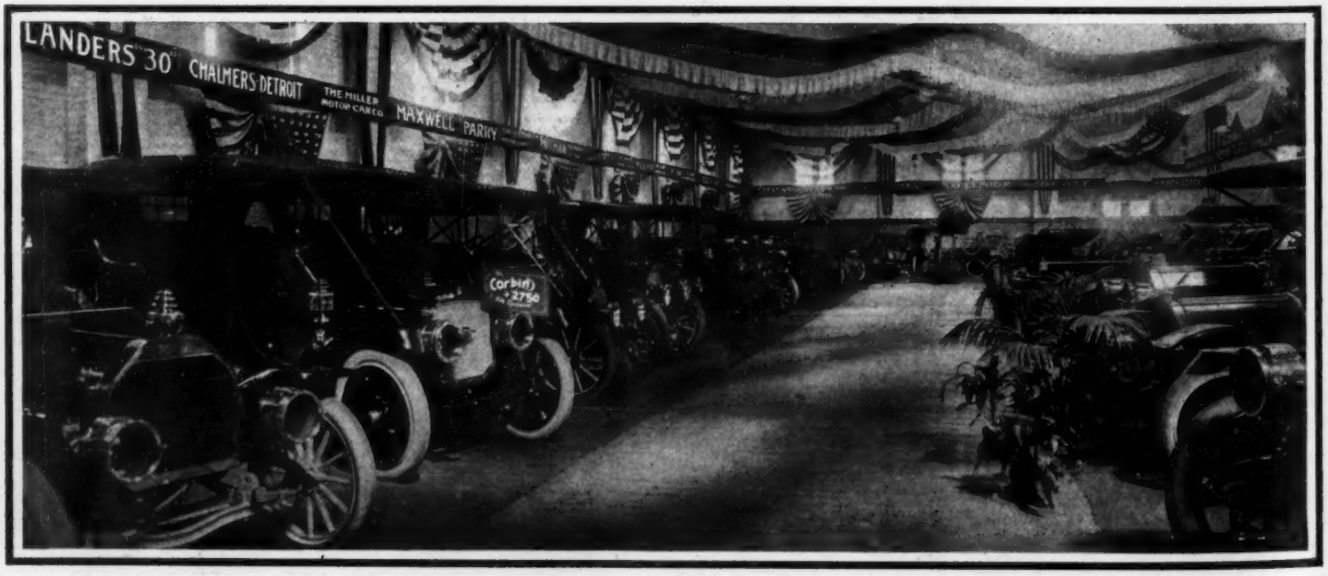
Armory Where the Exhibits Delighted the Automobiling Public of Bridgeport, the Home of Locomobile

Bridgeport Demonstrates Attraction of Shows

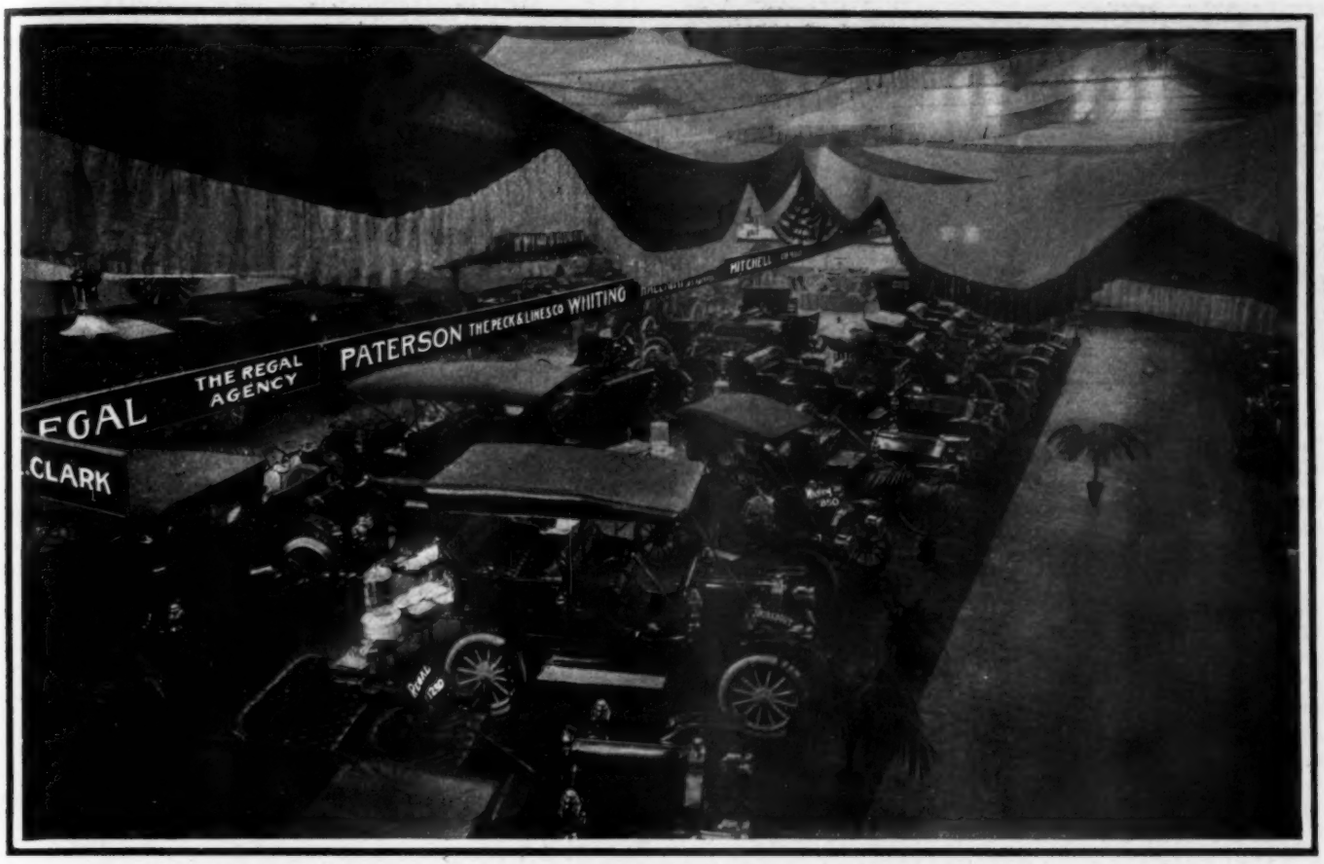
BRIDGEPORT, CONN., March 21—The attractions which an automobile show hold forth to the public were well demonstrated by the large attendance which has been the feature of the Automobile Show here from the opening night on. The show is held in the Armory, by the Bridgeport Automobile Dealers' Association, the officers of which feel satisfied with the results thus far.

Opening on Wednesday, March 16, the show is scheduled to continue for three days, closing on Saturday night. The opening night was marked by a crowd well in excess of 2,000 people, which is large, considering the size of the town and the hall in which the show is held.

As one enters the armory the sight is a most pleasing one. The decorative effect is excellent. As stated previously, the color scheme of the decorations is green and white. There are



Exhibits of Flanders, Chalmers, Maxwell, Parry, Pullman, Cadillac, Midland, and Speedwell Occupied One Broad Aisle



View of Spacious Main Floor, Showing in Particular the Exhibits of Regal, Paterson, Whiting and Mitchell

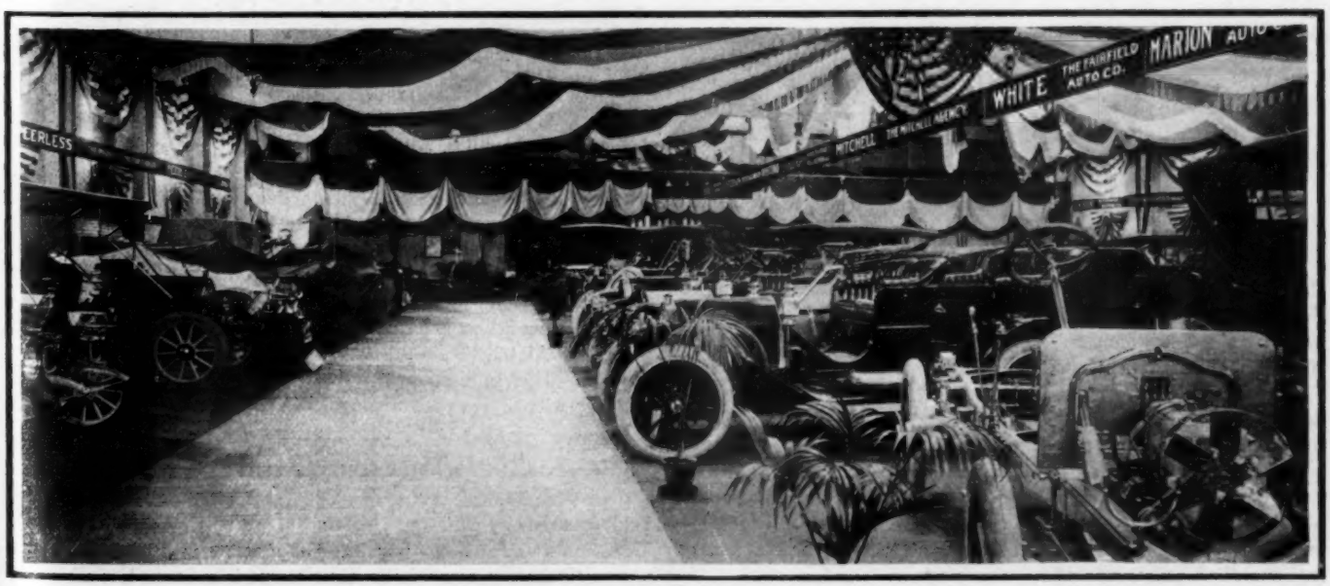
many American flags on the side walls, and the blending of the national colors with the white and green has made a fine combination, one which attracts much attention.

The exhibits are in the center of the hall and on both sides. The center is by no means the most attractive spot. The cars rest upon green crash, and the booths are separated by white tape. This gives a full view of the entire exhibit without the offensive break of the usual wooden railing. The elimination of the wooden railing and the use of the white tape instead is a most desirable and commendable feature of the booths. By the use of the tape the dealers have made their show much more attractive and have shown some taste.

The show was opened without much ceremony, the only thing being a speech by the Mayor, and a reply by the president of the Dealer's Association, W. D. Rantz. During the evening, music was furnished by the Wheeler & Wilson band.

Among the other attractions, Post & Lester showed a small model of a Wright biplane, which was made in France. The attendant in charge of this booth had to answer a constant fire of questions.

The way in which interest keeps up the general enthusiasm and feeling of hustle and bustle are cause for congratulation, and the auto dealers feel that they have accomplished something, as indeed they have.



Another Aisle, Along Which Were to Be Found Peerless, Marion, Mitchell, and in the Foreground, White Chassis

RECENT CLUB ACTIVITIES

NEW HEADS FOR BUCKEYE CLUB

COLUMBUS, O., Mar. 21—The annual election of officers and banquet of the Columbus, Ohio, Automobile Club will be held March 29 at some place to be selected at a later date. A large attendance is expected, since the campaign for membership has been inaugurated. Much enthusiasm in the affairs of the club is shown.

The two tickets to be voted at the coming election have been completed by the nominating committee. The tickets follow: President, Dr. W. D. Inglis and Charles E. Firestone; first vice-president, Dr. C. S. Means and Norman O. Aeby; second vice-president, Sherman D. Brown and Charles C. Janes; board of governors, Perin B. Monypeny, Herman Foster, Dennis Kelly, Rev. J. H. Dodson, Nelson J. Ruggles, M. J. Hanley, William M. Frisbie, D. B. Neil, C. S. Krumm, Dr. George P. Stephenson, Dr. H. A. Radebaugh and H. S. Waite. Six are to be elected. The new constitution and by-laws was adopted at a recent meeting and a complete reorganization of the club has been effected. Instead of the affairs of the club being looked after by the officers everything is now in the hands of the board of governors, consisting of six members and the four officers *ex-officio*.

Every member was placed on the committee of reception for the entertainment of the delegates to the convention of the Ohio State Automobile Association, which met in Columbus March 16.

MORE ACTIVITY IN QUAKER CITY

PHILADELPHIA, Mar. 21—The First Volunteer Motor Corps is the title of an organization of the Quaker City Motor Club, Philadelphia, Pa. It was organized two years ago with a view of quick mobilization in times of national, State or municipal danger. Several days ago, at a time when street car strike disturbance was at its highest, this force volunteered its services to the Mayor of the city and as soon as assembled they did excellent service for the Department of Public Safety. The owners and drivers have been sworn in as special police and provided with badges and arms. The president of this organization is Charles J. Swain; others connected are: P. D. Folwell, Richard Sellers, J. Fred Betz, 3rd, Edwin H. Lewis, Louis Vogel, C. Edgar Shreve, J. F. Morgan, Evans Church and Archie James.

WESTERN PENNSYLVANIA NOTES

At the annual meeting of the Automobile Club of Pittsburg, Pa., held February 21, the following officers were elected for the third year: President, Edward Kneeland; vice-presidents, Edward Kent, William N. Murray and William A. Seif; secretary, Hall C. Wolff; treasurer, William A. Heyl.

The automobile show held in Sharon, Pa., was quite pretentious. It opened March 1 and continued three days with the following as exhibitors: Buick, Rambler, Parry, Ford, Hudson, and Chalmers. An orchestra enlivened the occasion and the automobiling public, which is increasing very rapidly in the Shenango Valley, was present en masse. The show was conducted by W. C. De Forrest & Son, who made a special effort to have the decorations above the average.

SYRACUSE CLUBS EVINCE MUCH ACTIVITY

SYRACUSE, Mar. 21—The Automobile Club of Syracuse has made still another addition to its already large membership. At the last meeting twelve more members were elected, making a total to date of 422. This large organization has set a mark of 500, which it hopes to reach by the first of July, and it is expected by the officers that a long step toward this object will be taken at the coming automobile show in Syracuse. For the purpose of bringing this about, the club will have a booth at the show where an active campaign for membership will be carried on. The annual banquet of the club was held at the Yates on Thursday evening, March 10, the eighth recurrence of this social feature of the organization.

ANNUAL ELECTION NEXT AT CINCINNATI CLUB

CINCINNATI, Mar. 21—The Automobile Club of Cincinnati having successfully carried out its first annual automobile show is now engaged in making arrangements for the annual election which will take place on March 27. Dr. C. L. Bonifield, the present head of the organization, will, it is believed, have no opposition if he again runs for the office of president. A move has been started to open a publicity bureau at the club and it is believed that with the proper person at the head of such a bureau, much good can be achieved by the Cincinnati organization.

FARTHEST SOUTH STATE CLUB ORGANIZATION.

TAMPA, FLA., Mar. 21—Motor clubs of Florida have formed a State body, a permanent organization of which was effected in Tampa, Fla., on February 24. It will be known as the Florida State Automobile Association, and at present comprises clubs from eight cities. The board of directors are: E. Ed. Bryan and Capt. C. S. Washington, Tampa; G. B. Reynolds, Fort Meyers; W. W. Clark, Bartow; Judge Syd. L. Carter, Gainesville; Albert W. Fisher, St. Petersburg; T. C. Calmes, Plant City; E. L. Lesley, Kissimmee, and J. H. Spencer, Ocala.

MOTORCYCLE CLUBS VERY ACTIVE NOW

SYRACUSE, N. Y., Mar. 21—The Syracuse Motor Cycle Club has launched a movement with a view of securing the 1910 Federation of American Motorcyclists convention. The president of the Syracuse Club was directed to appoint a committee to invite the Board of Directors of the Federation of American Motorcyclists to designate Syracuse as the meeting place.

SHOW BREVITIES

BAD WEATHER DAMPS ENTHUSIASM AT TERRE HAUTE

TERRE HAUTE, IND., Mar. 19—Although an artistic success, which gave the people of the town a better idea than before of the importance of the automobile industry, the show which just closed here was a box-office failure, and its promoters are out a considerable sum. The expenses incurred by the management amount to some $500; the decorations and band cost $200, rent $100, and various incidentals not less than $200 more, making a total outlay of $1,000. On the receipts side it appears that 1,430 persons paid to see the show, their contributions amounting to $357.50. The smallness of the attendance is laid to the bad weather which prevailed during show week.

SPOKANE, WASH., SCHEDULES ITS FIRST SHOW

SPOKANE, WASH., Mar. 19—The first automobile show to be held in this city will open at the Princess Rink next Monday. Two hundred machines will be exhibited and a number of aeroplanes, including one of the Curtiss models from Los Angeles.

PROSPECTS GOOD FOR PASSAGE OF REGISTRATION BILL

Favorable action on the Federal Registration Automobile Bill at an early date is confidently expected by the automobilists of the country as the result of the presentation of the merits of the bill before the delegates in Washington at the recent legislative convention of the American Automobile Association. The encouraging feature in this respect is due to the keen interest shown in the bill by the members of the Committee on Interstate and Foreign Commerce, before whom the hearing was held on the last day of the convention.

As expressing the sentiment of the delegates attending the recent legislative convention, among whom were representatives of Governors from States extending from the Atlantic to the Pacific and from the Gulf of Mexico to the Great Lakes, a resolution was unanimously adopted advocating the passage of the Federal Registration Bill. The resolution follows:

"Whereas, the bill providing for federal registration of motor vehicles, known as H. R. 5,176, introduced by William W. Cocks, of New York, and now pending before the Committee on Interstate and Foreign Commerce of the House of Representatives, meets the approval of all who have given the matter careful consideration, and the prompt enactment of such a law is necessary for the unhampered development of interstate commerce and travel by means of motor vehicles;

"And since it is only through federal legislation that the unjust and unwarranted burdens now imposed upon such interstate commerce and travel can be removed;

"Now, therefore, be it resolved, That the National Legislative Convention of the American Automobile Association, held in Washington, D. C., on February 15-17, 1910, does urge the speedy passage of this measure, and pledges itself to use every honorable effort to accomplish its enactment."

One of the strongest supporters of the Federal Registration Automobile Bill is Representative William G. Brantley, of Georgia. "The time will come, I predict," he said, "when Congress will be compelled to take hold of the interstate commerce of automobiles and regulate and protect it. Whatever appeal you make to Congress should be predicated upon the right of Congress not only to protect and regulate, but also to restrain and properly control the growing commerce of the country."

Senator Chauncey M. Depew, of New York, who delivered one of the strongest addresses at the convention, cited the fact that ten years ago there were but seven hundred cars in use in the United States, while now the number is three hundred and fifty thousand, aggregating in value $419,000,000.

ROAD BUILDING NEWS

PENNSYLVANIA HOTEL KEEPERS WANT BETTER ROADS

STROUDSBURG, PA., Mar. 21—The annual meeting of the Monroe County Mountain Resort Association, held here recently, was marked by a mass meeting held in the Court House in the interest of good roads. The session was attended by men interested in the resorts, as well as business men of New York and Philadelphia.

W. P. Colton, of New York, was the chairman of the meeting, and the principal addresses were delivered by J. H. Weeks, the head of the Delaware County Automobile Association; E. N. Clark, of the Scranton Automobile Association, and A. B. Dunning, of the same city, a civil engineer; W. C. Freeman, of New York, and Benjamin Butterworth, of Brooklyn. All the speakers impressed upon the minds of the audience the importance of good roads to the summer resort business. The annual banquet was held at the Indian Queen this evening.

The hotels of the Water Gap district, like those in many other parts of the country, are feeling the benefits of the growth of automobile touring.

THE LAW AND THE AUTOMOBILE

NATIONAL GRANGE URGES ENACTMENT OF FEDERAL BILL

One of the strongest arguments in favor of the Federal Registration Bill was made by ex-Governor N. J. Bachelder, of New Hampshire, and Master of the National Grange, with its membership of upward of a million farmers. Governor Bachelder also looks at the purposes and benefits of the bill from the broad viewpoint of the farmer, and he stated at the legislative convention that, while regarding the automobile as an important factor in bringing into the State residents of other places who desire to purchase farms and make their summer homes there, it is also necessary to consider that proper means of travel must be offered.

"The experience of the past six or seven years has shown that different laws on this subject have resulted in many complications tending to discourage even the orderly use of the automobile," he stated. "In some States the natural resentment against the dangerous rate of speed at which automobiles were being operated has resulted in the enactment of unreasonable laws, which defeated their purpose by imposing regulations so stringent that they could not be enforced. And a law that is not enforced is worse than no law at all. For instance, many residents in New York City live for four or five months of the year in the State of Maine. The pleasantest method of reaching their Summer homes is by an automobile trip through Connecticut, Massachusetts and New Hampshire. As travel of this kind is clearly interstate commerce, they can properly claim the right to go through these various States without being forced to pay taxes for the privilege of passing over the roads. I understand that the Supreme Court of the United States has decided that the imposition by a State of taxes on a traveling salesman coming from other States is unconstitutional, and it would seem that if they cannot tax citizens of other States doing business temporarily within its borders it has no right to tax them while merely passing through its territory."

IMPORTANT LICENSE DECISION IN OHIO

COLUMBUS, O., Mar. 21—Upon the request of State Registrar of Automobiles Fred H. Caley, Attorney-General U. G. Denman of Ohio has rendered several decisions of great importance to auto owners. The first question submitted was whether or not a license and set of number plates can be transferred from one owner to another upon the sale of a motor vehicle. After analyzing the law, the Attorney-General comes to the conclusion that such cannot be done legally. He quoted the laws as follows: "Every owner of a motor vehicle acquired during any year shall, immediately upon acquiring such motor vehicle, file an application with the necessary fee for registering the motor car." He says no exception is made to allow the license to be transferred with the car.

Upon the question of using the same set of number plates on different cars by one owner, the Attorney-General says that it is unlawful for a person selling a motor vehicle to transfer the tags to a new motor vehicle purchased by him.

The Attorney-General also rendered an opinion in which it is held that all motor vehicles excepting fire engines and ambulances have to be registered, notwithstanding the ownership.

Aeroplane Weight and Power

Editor THE AUTOMOBILE:

[2,197]—Please answer these questions through "Letters Interesting and Instructive":

1. What is the smallest wing surface of an aeroplane that will lift two hundred pounds?
2. Would it require a high or low powered motor to lift this weight?
3. Where is the elevating rudder located on the Blériot monoplane?

LESLIE M. SANEDER.

Denison, Kan.

There is a considerable variation in the surface required, depending on the shape of the surface. A relatively flat surface will support less weight than a more curved one, but, weight for weight, requires less power. The Wright machine, the surfaces of which have a curvature of but one in 20, carries only two pounds to the square foot, but does so with one horsepower to every 41 pounds. The cross-channel type of Blériot, with a surface curvature of one in 12, carries 4.5 pounds to the square foot with one horsepower to every 29 pounds. The Wright machine can average 40 miles an hour to 36 for the Blériot (all figures relate to the Blériot fitted with the three-cylinder 25-horsepower Anzani motor). Thus you can suit yourself in both ways; you can either have a small high-powered machine, or a large, low-powered one to carry the same weight.

The Blériot monoplane has its elevating rudder in the rear, its front edge being about 8½ feet from the rear edge of the main surfaces. There are really two rudders, one on each side of a stationary surface, but acting in unison.

The 1910 model Blériot, known as type 11 *bis*, is said to carry 6½ pounds to the square foot, being both smaller and heavier than the 1909 model.

Licensed and Unlicensed Cars

Editor THE AUTOMOBILE:

[2,198]—Will you kindy tell me through the columns of your esteemed paper what A. L. A. M. means, and what its connection with the Selden patent is? Notice that there is considerable discussion on this question now, also that parties purchasing unlicensed cars are liable to suit. As I am contemplating the purchase of a car, I would like this information for personal protection.

Fond du Lac, Wis. A. W. BISSETT.

The initials A. L. A. M. are but an abbreviation or shortening of the full and very long name of the association, which comprises all of the makers authorized under the Selden patent to make and sell cars, the full name being Association of Licensed Automobile Manufacturers. This association does not actually own the patent, that being the property, either wholly or the controlling part, of the stockholders of the old Electric Vehicle Company, Hartford, Conn., but the association decides by vote which among the applicants for membership shall be given such membership, the same election being subject to the approval of the aforementioned owners.

As far as a suit is concerned, it has been laid down as the policy of the association and the patent owners, not to take such a course, at least not until the patent is definitely and finally upheld by the higher courts. This is a matter which will doubtless carry over until 1911, for certain, and possibly until 1912, in which latter year the patent expires.

Parts for Discontinued Cars

Editor THE AUTOMOBILE:

[2,199]—Can you advise me through "Letters" where I can get Queen automobile parts, knowing that the Blomstrom concern is now out of business. I need some parts for my transmission and so must find the party who has the patterns and makes the parts.

Marysville, O. L. HENDERSON.

Parts for these cars may be obtained from the Auto Parts Manufacturing Company, located at St. Antoine street and Michigan Central Railway, Detroit, Mich. This firm not only make and sell the parts for the Queen cars, so they inform us, but also for the Northern and Wayne cars, neither of which are now regularly manufactured.

Simple and Efficient Still

Editor THE AUTOMOBILE:

[2,200]—I am a subscriber to your valuable journal and have recently become deeply interested in the prevention of radiator inefficiency due to the incrustration of the various mineral salts suspended in the water used. Will you kindly give a sketch of a simple and cheap still such as may be made by the local tinsmith, since the use of distilled water seems to be the only absolute way of preventing incrustation. "An ounce of prevention is worth a pound of cure," so they say. P. L. MORGAN.

North Ridgeville, O.

This is an excellent plan, and the simplest still that can be suggested is made from an old tea kettle, rubber tubing, two long glass tubes of different diameters, one large, one small and more rubber tubing. As this apparatus is so simple that any one can buy the materials, assemble them, and then have the use of perfectly pure water, it will be described in detail.

First buy from the drug store a length of rubber tubing of rather thick walls, large enough inside to go over the spout of the tea kettle which you intend to use and long enough to lead from the tea kettle situated over the fire to a source of cold water, which, if the kitchen be utilized, will be the kitchen sink. Then buy a small diameter glass tube, which will fit one end of the rubber tube very tightly.

Next buy another and much larger glass tube, say, 1 1-2 in. inside diameter, but about an inch shorter, the first one being about 18 in. long. Finally you will need another short length of rubber tubing of the same size, not over two feet long.

Put the tea kettle on the store, attach the long rubber tube, leading it over to the source of water, then slip the larger tube over it, and manage to hold it in that place by some means so that the cold water from the faucet can run in the upper or open end of the large tube. Hang the combination of the two tubes one within the other so that both are slightly inclined. The object of the inclination is to permit the cooling water to flow around the inner tube and then out to the sink drain. This flowing cold water will condense the steam in the inner tube, which will then flow through the shorter rubber tube (attached to the other end) to some convenient receptacle.

The process will then proceed as follows: Water put into the tea kettle will be converted into a vapor, steam, leaving the impurities behind in the tea kettle. This vapor will pass through the long tube to the glass, when the cold water flowing around the outside will condense it to a liquid again, which will then flow through the shorter rubber tube to the receptacle. Using as large a tea kettle as possible, and carefully bottling the resulting pure water in bottles with ground-glass stoppers, which have previously been scalded out clean, will result in giving you a source of pure water which can be used without fear of trouble from incrustation.

A more elaborate still may, of course, be made, but at some expense. This, however, would present many features which would be worth the money expended to motorists able to spend that amount, so that a drawing of one will be presented at an early date.

A variation of this idea, to dispense with the breakable glass tubes, would be to get enough rubber tubing not only to lead to the sink but also to form several coils around the bottom of a tub or dishpan. The tubing would then be in one piece, with one end connected to the spout of the tea kettle and the other connecting with the receptacle for the distilled water.

ANSWERED AND DISCUSSED

Starting on the Spark

Editor THE AUTOMOBILE:

[2,201]—To settle an argument, will you kindly tell me if a car will not start off the switch; is it because the cylinders do not hold compression? A manufacturer here states that compression has little to do with it, as he says that he has taken out his spark plugs, looked at them, replaced them, and then started on the switch. I was under the impression that the gas would escape as soon as the spark plug was loosened, or if the valves did not shut closely. He says that only the extra quantity that is compressed will, because, as gasoline vapor is heavier than air, enough to fill the cylinder will remain there, but he states if the mixture is not proper when the gas is not compressed one cannot get the explosion, whereas if the mixture is correct one gets explosion enough to turn over the engine on the spark taking place, although there is no compression whatever. Is he correct in this? If he is, does one need a rich mixture or a poor one? AMATEUR.

Toronto.

Your information is somewhat misleading, for while a correct mixture is a necessity for starting purposes, and an explosion of such a mixture may be produced when it is not compressed, this latter occurrence is so rare as to be almost negligible. In fact, a more truthful statement would be that compression is absolutely necessary, so that the writer of the above letter is more nearly right than his informer.

Starting on the spark depends upon the retention of the compression, from the fact that the spark obtained under stationary conditions is fairly weak, and as such would not ignite a partly compressed mixture, or one not compressed at all. More than this, it is a pretty safe statement that the rich mixture is easier to ignite than the weak, and that compression leaks would result in a comparatively weaker mixture, so that from that viewpoint the mixture not compressed would also be more difficult to explode.

It is doubtful if the experiment spoken of, in which the spark plugs and other parts were removed from the cylinder, leaving them open to the atmosphere, and that then, after replacement. the engine was started on the remaining mixture, on the spark. ever happened, or could be made to happen.

Names and Makers of Carburetors

Editor THE AUTOMOBILE:

[2,202]—In the issue of January 6, 1910, I notice, under the head of "Things That Attract in the Accessory Field," and under the sub-head "Carbureters Show Encouraging Improvement," a mention of a device for mechanical atomization in one carbureter, and a needle valve construction in another for the same purpose. The names and manufacturers of the carbureters are not given. Will you please give me their names, as I desire to get their catalogs or descriptive matter. H. CASSEDY.

Brookhaven, Mass.

The device for mechanical atomization you refer to we believe is the "Homo," although this is not a carbureter, but is intended to be placed in the inlet pipe between the carbureter and the motor. It is made by the Gasoline Motor Efficiency Company, ersey City, N. J. The other carbureter referred to is doubtless the Breeze, made by the Breeze Carbureter Company, also of Jersey City, N. J.

There are a number of devices which nearly fit the descriptions given, so that an exact selection is nearly out of the question. It is hoped that the writer of the above letter will bear this in mind when reading the above letter.

Can One Vibrator Do Work of Four?

Editor THE AUTOMOBILE:

[2,203]—I have an old four-cylinder, four-cycle car with a four-unit coil and dry batteries. When the vibrators are set right the motor runs very well, but after the car has gone a few miles some of the vibrators lag, the engine fires unevenly and the vibrators have to be adjusted. I have read about the master vibrator, and the theory of it seems right, as synchronism is very important, but I cannot understand how one vibrator can do the work of four when four cause so much trouble. Are master vibrators as successful as the makers claim? I have also read of the benefits of the Atwater-Kent "Unisparker," which does away entirely wtih vibrators. Is it a fact, as they claim, that one spark fires a charge as effectively as a series of sparks, as in a vibrating coil? Do you think either of the above methods would cure my trouble? T. W. M.

Little Ferry, N. J.

The first description of your trouble sounds very much like that old bugbear, weak batteries. Are you sure that a new set would not put your engine right again, without considering any further changes.

Master vibrators are very satisfactory in service. There is no trouble about making the one vibrator work overtime, as when four are used each one is working less than one-fourth of the time. If you were employing four men who only worked two hours a day each, you wouldn't hesitate long in replacing them by one man who would work eight hours.

The theory of the Atwater-Kent device is correct, as one spark is sufficient to fire the mixture under proper conditions. With a series of sparks, if the first one does not come at the right time, or fails to ignite the mixture, the result is practically a misfire; for even if the others of the series do succeed in causing an explosion, it will not be of sufficient strength to assist in running the engine.

There is no reason why your engine should not be made to give satisfactory service with its present ignition system, but either of the two devices would save your battery consumption.

Materials for Garage Floors

Editor THE AUTOMOBILE:

[2,204]—Will you please tell me what is the objection, if any, to a garage floor being of paving brick? Isn't it (brick) less liable to absorb and show oil and other spots than a concrete floor? Also, how is it best to lay them? CLAYTON.

Oshkosh, Wis.

Not only is there no objection to the use of paving bricks for garage floors, but their use is an excellent thing. The bricks will not, as the letter above brings out, absorb moisture, oil, grease, nor anything else liable to be on the garage floor, but moreover, has the big advantage of being readily and quickly laid by anyone, while cement, although easy to lay, is dodged by the ordinary amateur workman as a dirty if not complicated job.

The best way is to lay them on edge, but this has a disadvantage, where cost is the prime consideration, of nearly doubling the initial cost of the bricks. The best way would be to lay them on a deep bed of sand, and bond with cement, although tar may be used as a bond, or the bricks may even be laid up loose, without any bond, and later on a thin grout of cement or tar or other material poured in between them.

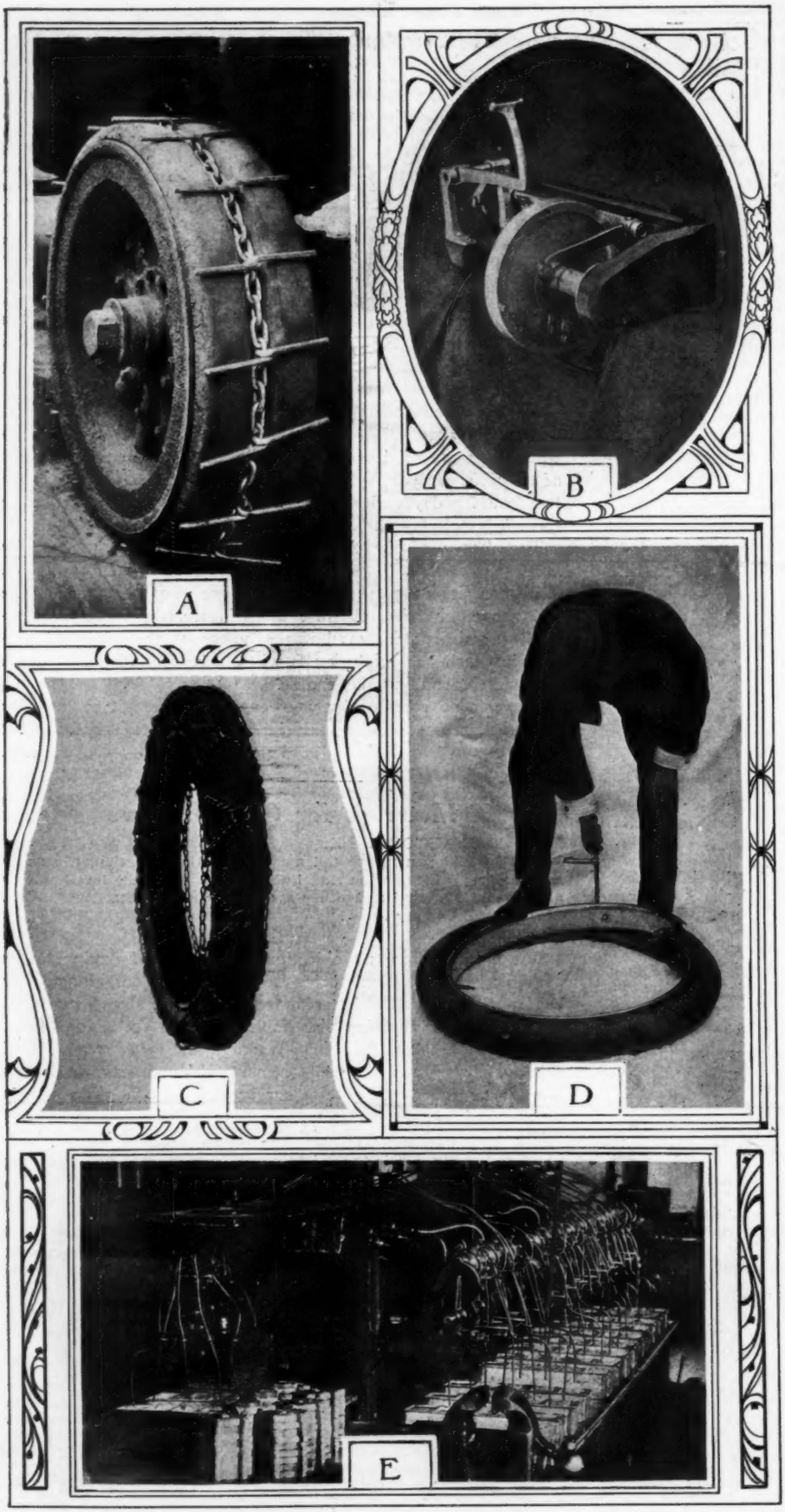
Graphite Used in Care of Tires

Editor THE AUTOMOBILE:

(2,205]—In your reply to No. 2,141, Letters Interesting and Instructive, you advise painting the inside of the tire shoe and the outside of the tube with graphite. Kindly state how to prepare graphite paint for this purpose. G. L. STAYMAN.

Indianapolis.

"Painting with graphite" seems to have been a misleading term. Of course none of the ordinary oils used for paint bodies would be suitable for this purpose, as they would rot the rubber. What was meant was that the graphite should be applied in its powder form. either by dusting it on or using a brush. French chalk is also used for the same purpose.



A—New Scranton Traction Tire Chain as Tried on Rear Wheels of a 3-Ton Packard Truck
B—Wilkinson Foot-Pedal Actuated Starting Device for Gasoline and Other Engines
C—Walker Non-Skid Tire Chain Which Has Many New and Excellent Features
D—Universal Demountable Rim, Showing Ease of Use, Applied With One Hand
E—Testing a Row of Maxwell-Briscoe Oilers at the Tarrytown Factory

Accessories

Traction is just as much of a problem in connection with large trucks and wide solid tires as it is when reference is had to touring cars and pneumatic tires. The tractive ability, while it varies somewhat with the nature of the tire equipment, is very largely dependent upon the weight resting upon the wheel and the character of the roadbed. The weight multiplied by the coefficient of friction represents the situation in the main, and non-skid devices are utilized to increase the friction. Fig. A, shows a scheme as it was applied to a Packard truck, which embodies the use of a substantial chain around the girth of the wheel, placed between the two tire members and substantially flush. A series of equidistant laterally disposed bars, with eyes which engage the chain links, are responsible for the good work done. This system is known as the Paragon chain, and was exhibited on Packard trucks during recent shows by F. H. Scranton, Thoroughfare Building, Broadway, New York City.

There always has been a certain amount of danger to the inexperienced autoist who disregards instructions and assumes a clumsy attitude when cranking a motor. Sometimes the back kicks which are experienced are due to a derangement in the timing system, or to the absent-mindedness of the autoist who attempts to crank on an advanced spark. Even if the spark is properly retarded, it is perfectly possible to have trouble of this sort, provided the autoist fails to vigorously spin the crank. This trouble will be the more noticeable in motors with a high compression, especially after they have been heated up, and if lazy methods of cranking are indulged in. It is on this account that inventors have undertaken to supply a means which will serve for the purpose and protect the autoist during the process. Fig. B shows just such a device, which was exhibited at Detroit by J. Franklin Wilkinson, and is designated as a mechanical motor starter. It is

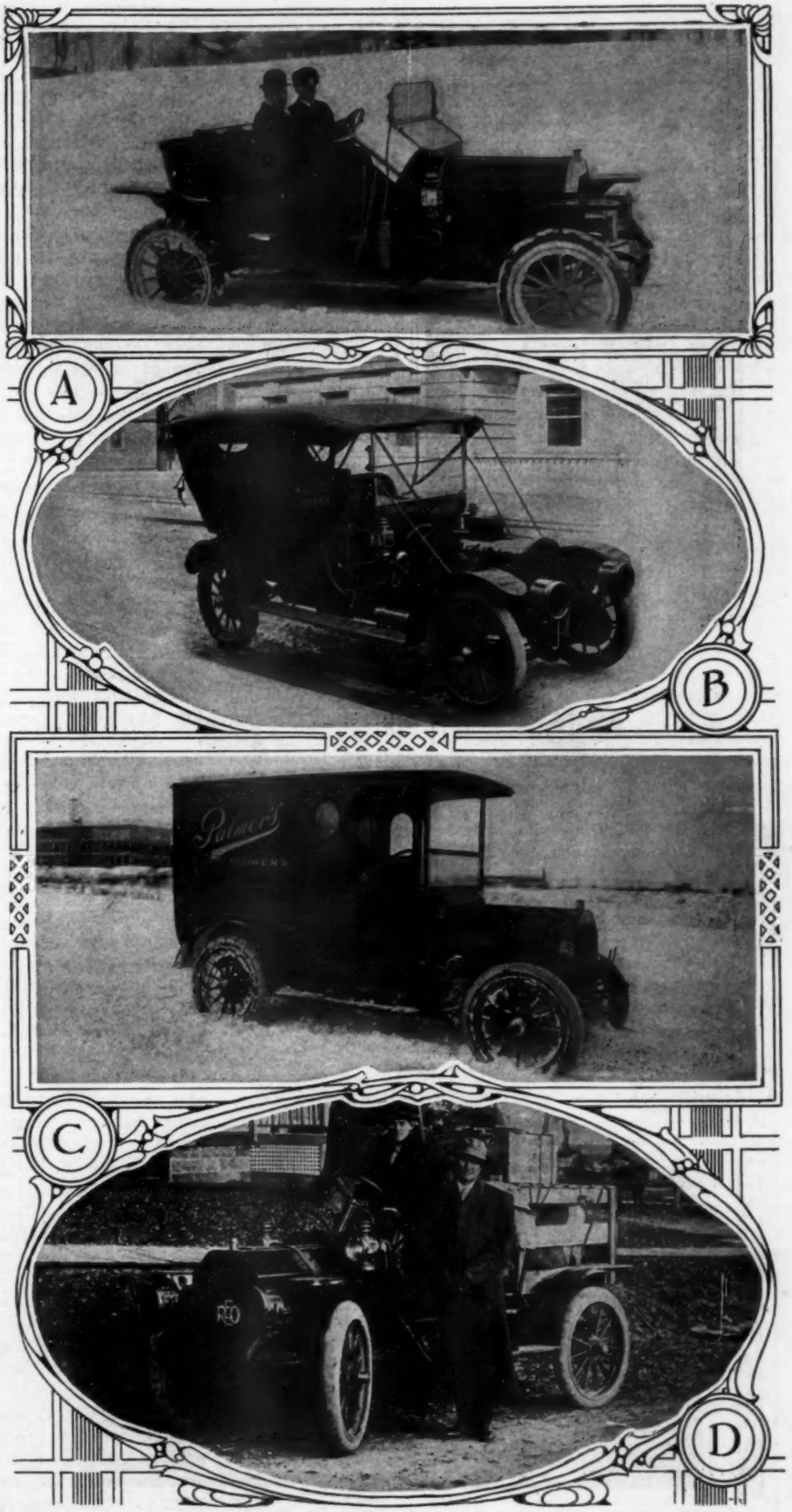
(*Continued on page* 616.)

Making a Demonstration

(A) Inter-State "40" touring car being tried out by C. S. Welch, sales manager of the company, with C. E. Easton, advertising manager, in the other seat. This car is shown with lamps, generator, folding glass front, and everything complete as required by an autoist for efficient work. The body represents a distinctly Inter-State innovation which is growing in popularity. The 4-cylinder water-cooled motor has cylinders with a bore of 4½ inches and 5-inch stroke, a cellular radiator aided by a centrifugal pump is responsible for cooling, and a U & H magneto, with a coil and dry cells in the auxiliary position is assurance for proper ignition work. Lubrication involves the use of a pump, and a multiple disc clutch has 63 members, thus presenting an unusually large area of surface. The transmission is a three-speed selective, to a shaft drive, and the wheelbase is 118 inches. This car weighs 2700 pounds, has 34 x 4 tires all around, and sells for $1,750. The Inter-State Automobile Company, Muncie, Ind., maker, reports an easy market for this car, and excellent progress in the process of manufacture.

(B) The latest Franklin innovation is shown in Fig. B, which represents a Franklin model fitted out with a glass bonnet, so that during demonstration by the company's representative intending purchasers are enabled to observe the workings of the new Franklin air-cooling system, which is so contrived that the cooling air is definitely measured out for each of the respective cylinders, thus eliminating all differences in cooling as between them. The idea attracts attention because of its novelty, but there is a certain underlying virtue attached to the plan, and those who are but little skilled in a mechanical way, are enabled to more clearly understand the underlying principles of the Franklin design. The H. H. Franklin Mfg. Co., with its large plant at Syracuse, N. Y., is having excellent success with both its 4 and 6-cyl-

(*Continued on page* 616.)



A—Inter-State Roadster, with Sales Manager Welch at the Wheel and Adv. Manager Easton
B—Franklin 1910 Demonstrating Car with Glass Hood to Show Workings of Engine
C—Pierce-Arrow 1906 Touring Car Converted Into a Delivery by Buffalo Florist
D—Two-Cylinder Rod Serving as a Live Stock Transport in the West

WHAT THE SELDEN PATENT DECISION DECIDED

SCOPE OF THE DECISION AND ITS OPERATION

By Xenophon P. Huddy, LL.D.

IT is familiar history that Judge Hough of the United States Circuit Court for the Southern District of New York upheld what is known as the Selden Patent after a bitter legal controversy which was waged for years. Although this decision is not final and an appeal has been taken from it, still it is of the greatest interest and importance to the automobile industry and users of motor vehicles. If the appeal fails, Judge Hough's decision stands and it should be borne in mind that the burden rests upon the appellant, the defeated party, to show that the decision against him is illegal and ought not to stand. The appellant in this case has the onus and the burden of upsetting that which the lower court decided. He who asserts that a wrong or an error has been committed, has the affirmative upon his shoulders. So it may be said that the first point of advantage gained by the Electric Vehicle Company by the decision referred to was, to place the burden on the defendant to show that the Selden Patent is invalid and Judge Hough's decision sustaining it, is erroneous. This decision is officially reported and may be found under the title Electric Vehicle Co., et al. vs. C. A. Duerr & Co. et al., in volume 172 Federal Reporter at p. 923. The actual questions decided by the Court are as follows:

WHAT THE DECISION HELD

"The Selden Patent, No. 549,160, for a road locomotive, granted in 1879, claims 1, 2 and 3 are all for combinations the elements of which were all old in some form, although changed, modified, and co-ordained by the patentee to adopt them for harmonious action in such combinations, especially the "liquid hydrocarbon gas engine of the compression type," which constitutes the motive power and is the most important feature. At the time of the filing of the application, the art to which it relates, that of a self-propelled road vehicle with a considerable radius of action over ordinary highways and capable of management by a single driver, and he not necessarily a skilled engineer, had no practical existence, and the patent, which embodies all the parts of an operative vehicle of that kind, discloses invention of a primary character. As so constructed, claims 1, 2 and 3 are infringed by the Ford machine, and claim 1 and 5 by the Panhard French machine."

COMMENTS ON THE DECISION

The above is set out verbatim as it appears in the law report so that the reader may properly understand the specific points passed upon by the Court. From the many newspaper accounts of the decision written by laymen, it is quite possible that the automobile public may have received mistaken impressions. The decision and the opinion of the Court have been commented on extensively throughout the United States and Europe. The legal periodicals have also discussed the decision as appears in the editorial reprinted in this number from "Case and Comment." The author of this editorial is asserting broad propositions in apparently disagreeing with Judge Hough. Of course, almost every case has two sides before it is passed upon by a competent Court and even if a judicial decision is rendered, enough lawyers can be found who will disagree with the Court's judgment, since it is a part of the legal profession to disagree. No doubt one might be able to find a lawyer in this wide land who would disagree to any proposition of law that any court had decided against; so we should, before giving much weight to an argument against a decision, such as referred to above, examine and dissect the argument and the decision, compare the two and ascertain the truth or falsity of the premises upon which the dissenter's contentions are based.

WHAT ARE INVENTIONS

Of course, the subject matter of the patent must be *new* and *useful* and must have called for the exercise of the inventive or creative faculties of the originator. The article must be new whether the invention is an entire machine or an improvement on a machine, but the invention may consist of a combination of mechanical powers. This is the nut-shell of the Selden Patent decision. Notwithstanding the fact that old and well-known appliances were used, the Court says:

NEW USE OF BRAYTON'S ENGINE

"With Brayton's engine in mind, he [Selden] organized a new road vehicle. To be sure, he did substitute one old and well known prime mover (gas) for another (steam), but in so doing he devised and used an arrangement of Brayton's engine never before attempted, one that Brayton never suggested, made or patented, and without which the road vehicle was an impossibility. This mental concept constituted invention if capable of reduction to operation."

In conclusion it may be said that since the United States Circuit Court has found as a matter of fact and law that Selden's claims constituted an *invention*, even though admittedly composed of some old and well-known parts, and since the patent has been sustained and declared valid, it will be a difficult task for the defendants to overthrow the Court's decision by claiming to the contrary.

It will be noted that the point of this Selden Patent case is that the combination discloses invention of a primary character according to the language used by Judge Hough. It might be stated that Judge Hough is a man of learning in patent law and fully capable of handling all questions presented by the litigation, quite as much so as the writer of the editorial before referred to. Judge Hough is a lawyer of profound learning and his decisions have been uniformly upheld by the United States Appellate Courts.

SELDEN PATENT COURT DECISION ON NEW GROUNDS*

A NEW departure seems to have been taken in upholding the Selden patent on automobiles. The court says that no litigation closely resembling the case has been shown to it, and it cites no authority for its holding, so that it seems that the court itself recognizes that it is treading on new ground. The claim of the patent is for the "combination with a road locomotive provided with suitable running gear, including a propelling wheel and steering mechanism, of a liquid hydrocarbon gas engine of the compression type, comprising one or more power cylinders, a suitable liquid fuel receptacle, a power shaft connected with, and arranged to run faster than, the propelling wheel, an intermediate clutch or disconnecting device, and a suitable carriage body adapted to the conveyance of persons or goods, substantially as described." This, of course, is a mere claim for combination of several parts, all of which were old at the time, and it would seem that, if any patent for it could be

* Courtesy of "Case and Comment," published by the Lawyers Co-Operative Publishing Co., Rochester, N. Y.

sustained, then any application of power to the operation of any machine is subject to patent. In fact, although the claim is for a combination, when changed in form and reduced to its ultimate terms, it is merely a claim for the application of power in the shape of a gas engine to the running of a road vehicle. Such a claim has never been thought to be patentable. In fact, the court says, in referring to a machine manufactured by Rosenwald, that, even if it had been successful, he might, nevertheless, have found his patent invalid by American law, because each part of his vehicle was doing just what it had always done without any new "co-operative law," while his engine, in particular, was the same motor which, before it was applied to his brougham, had, perchance, driven a lathe, and might to-morrow do something else. On the face of Selden's claim, that is precisely what he did, and that would make his patent unsustainable. The court says that there is no denial that, in form, nothing but combination was claimed. But then comes the point of the decision, which seems to be in advance of the former law.

The court says that Selden's combination cannot be taken apart and each element recognized as something that had done the same thing or series of things before. It then proceeds to show that he took the old Brayton engine and made some alterations in it. He built a plurality of cylinders to minimize the necessity for a flywheel; he produced an inclosed crankcase, and used a small piston with a short stroke. By so doing, he devised and used an arrangement of Brayton's engine never before attempted —one that Brayton himself never suggested, made, or patented, and without which the road vehicle was an impossibility. So that, in 1879, when Selden applied for his patent, there was not one gas engine, which, in its then form, could be made an element in a road wagon combination. The court further says Selden solved this difficulty, and such solution gave him the right to claim broadly the thing which was the leading element in his invention when used in his combination. But he did not claim it. What he had invented was an improvement on the gas engine, but there is nowhere in his claim any mention of such improvement. What he claims is the combination, and that alone; and, so far as appears from his papers, the elements of his combination were all old and well-known. There is no suggestion that he had made an improved engine, and sought a patent on that, and the question then arises whether one can invent a part of a combination, and then, without mentioning or claiming his invention, simply make it an element of his combination, treating it as an old device, and when he secures a patent on his combination, shut others out of the use of the device which he has not claimed. Such does not seem to have been understood to be the law; and, from the fact that no precedents could be found, the holding that it can be done would seem to be a new departure in patent law. If the engine was in fact the old, well-known engine, the court itself, as above shown, says that the combination would be invalid. Does the fact that the engine was in fact new alter the case when Selden treats it as old, and makes no claim for it? Prima facie it would seem that, by reason of the fact that he abandoned his claim on it, so that it at once became public property, it would fall under the well-established rule which applies in any case of a mere aplication of power to the operation of machinery. From the opinion, the question of the sufficiency of the claim to cover this invention does not seem to have been considered by counsel, but they seem to have confined their attention to the question of fact whether or not Selden had a practicable working model when his application was filed, and whether or not defendant's machines infringed the patent. It is understood that the case will be appealed, and the question of the possibility of excluding the public from the use of a new device by simply claiming it as part of a combination may be presented to the consideration of the appellate court. If the device can be covered in that way, an interesting question arises as to the scope of the patent. The adaptation of the gas engine used by Selden in his automobile is practically the same as that used in motor boats, aeroplanes, and for other purposes; and, if that is Selden's invention, the question arises, Can he recover royalty for the use of it in all ways in which it is now used?

JERSEY AUTO BILLS VIGOROUSLY OPPOSED

DESPITE the fact that the Edge bill was defeated in the New Jersey Legislature, two more bills were introduced and it looks as if the autoists of the state will have to exercise their fighting ability before the end of the legislative term. The Edge bill, which suffered defeat, was to allow motorists registered in other States to tour New Jersey without further formality. The bill was expected to become a law, but it did not meet with the approval of Senator Joseph S. Frelinghuysen, President of the Senate, whose influence was sufficient to beat it.

One of the two bills which subsequently were introduced provides for an increase in the license fees of automobiles, and contains a joker which will do away with the present limited tourist privilege permitting non-resident motorists registered in their home States to tour New Jersey for eight days in any one year upon the payment of $1.

The second bill allows the State of New Jersey to pay one-half of the cost of the proposed new ocean boulevard, instead of the quarter of the expense of the construction of new roads, which the State usually bears, and also permits the funds in the State Treasury accrued from the licensing of automobiles to be applied to the maintenance of the boulevard, instead of dividing such funds pro rata among the counties.

Both bills, which are favored by Senator Frelinghuysen, are strongly opposed by the automobile interests of the State.

Resolutions attacking both measures have been passed by the leading automobile organizations of the State, the New Jersey Automobile and Motor Club of Newark, N. J., which has a membership of more than 2,000; the Associated Automobile Clubs of New Jersey, a federation of the clubs in New Jersey; the Automobile Club of Hudson County, with headquarters in Jersey City, and the North Jersey Automobile Club of Paterson, N. J.

The North Jersey Automobile Club held a special meeting recently and passed this resolution:

Whereas, Senate bill No. 215 provides for the diversion of money received for licenses of automobiles to other purposes than those named in the original bill covering licensing of automobiles as adopted in April, 1906, together with certain amendments added in 1909, and

Whereas, A Senate bill provides for increasing the license fees covering all automobiles above 15 horsepower; be it therefore

Resolved, That the North Jersey Automobile Club in special meeting assembled protest most vigorously against the passage of either or both of these bills and ask that the members and legislators for Passaic County and the State Senator representing this district not only to vote against these bills personally, but to use every honorable endeavor to influence other members of the Senate and Assembly to vote against their passage.

The members of the club also pledged themselves to work against any candidate for public office who votes for either of the two bills imposing added taxation on automobiles.

INTERESTING NEW JERSEY DECISION

An extremely interesting case on the question of the constitutionality of the New Jersey motor statute which requires a license from both cars and drivers is found in Cleary vs. Johnston, 74 Atl., New Jersey, 538. The complaint was that R. H. Johnston drove a motor car in the streets of Trenton, N. J., without having his motor car licensed and registered according to the law of New Jersey, and without having paid his registration fee.

The court held that the statute, which required registration by both resident and non-resident owners, was constitutional, and that the fine of $100 assessed must be paid.

THE AUTOMOBILE

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As the weather clears up and the roads become hard, a new gathering of autoists will start out; all will go in search of enjoyment, some for the sake of health, and of experience; it lies before them. Just how many inexperienced purchasers of automobiles there will be numbered in the aggregate, it is difficult to state. If statistics have any foundation, 100,000 is a low figure to fix upon. Of this number, if but one per cent. proves to be totally incompetent, the daily papers will have at their disposal subject-matter for 1,000 double head lines, and it may be that some of the columns of matter will contain nuggets.

It is a serious subject, this, and it offers wide opportunity for reflection. Those who fail to appreciate the improvements wrought in automobiles within a few short years will only remember the time when brakes were poor, steering equipment insecure, and the men at the wheel were ill-fitted to the task. They may have failed to take into account the subconscious automatism of the whole situation; brakes are now capable, steering equipment is reliable, and the whole populace has undergone a change. Men who do not profess mechanical knowledge seem to understand more about automobiles to-day than designers did yesterday.

It is fortunate that capability keeps stride with requirement; the leader barely outnecks the flock; the whole world advances in unison and yet there is the hindmost. It is the tail end of the procession which must be watched, and it matters not whether it is in an army, a fleet of battleships, or, instead, the users of automobiles.

That the tailenders are likely to come from the midst of he 100,000 who just purchased their first automobile, is a fair inference, and that they will be vigilant and prudent it is hoped. If they are unable to appreciate the extent of the hazard which attends blind and reckless driving; if it is not in their nature to allow for the safety of others, they will most likely belong to the class called selfish, and it may be possible to reason with them through their pocketbook.

The life of an automobile will be long, or short, depending merely upon the speed at which it is driven, and to a large extent quite independent of the quality of material of which it is made, or the accuracy of workmanship expended upon it. If the speed is 40 miles per hour, the depreciation will be four times as much as when the speed is 20 miles per hour. If, in turning a corner, the speed is excessive, the structural parts will then be subjected to enormous stresses relative to the work the parts will have to do at a high speed on a straightaway.

There is one other point which is a forceful argument to a pocketbook. No automobile, however well made (no matter how good the brakes may be) may be stopped within a certain distance, and this length is fixed by the speed and weight of the car, considering the adhesion of the traction (road) wheels.

An accident is a mathematical certainty if a car is driven at a speed so high that (considering the stopping distance allowed, in a given case) it fails to conform to the set conditions. An inexperienced autoist must learn what the stopping distance is for his particular automobile, and when he accomplishes this task he will then have to learn to judge of distance. When a new autoist becomes proficient in these important respects, he may then graduate into one of two classes, i. e., a prudent and respected citizen who knows it is ill-advised to exceed a reasonable and safe speed considering the surrounding conditions, and the man who, feeling his skill, takes the long chance.

♣ ♣ ♣

The several legislative bodies throughout the country are now busying themselves with legislative matters involving the automobile. In some States there are several bills pending, each one of which differs from the other in principle and detail. The sponsors for these bills, severally, stoutly maintain for their respective efforts that they are just what should be imposed upon the users of automobiles, and since each one of the bills differs radically from the other it is a self-evident fact that nearly all of them must be wrong in principle and in detail.

All that can be done by the autoists throughout the country is to oppose these half-baked efforts and go in for conservative and proper legislation, making sure that the laws will be of a character which will put reasonable restrain upon reckless drivers, whether or not they pilot a brewery wagon drawn by horses, a big touring car with the owner at the wheel, or a chauffeur who may indulge in a ride on his own account. Traffic regulations and road laws are just as necessary to-day as they ever were, but the wild talk which is heard by citizens who lack experience, keenness of observation and fairmindedness is not a sufficient foundation upon which to rest these regulations and laws. In the long run it is believed that sound reason will prevail, and all that autoists have to do is, have patience, be vigilant and vote tight.

Indianapolis Is Now Holding Opening Week

INDIANAPOLIS, IND., March 22—Local tradesmen are enjoying their annual opening week, which will close Saturday evening with a banquet at the Denison Hotel, when covers will be laid for four hundred guests. Charles A. Bookwalter, former mayor, will be toastmaster at the banquet and other speakers will include Gov. Thomas R. Marshall and Edgar Apperson.

The affair is under the auspices of the Indianapolis Automobile Trade Association, which includes fifty-nine manufacturing and retail concerns in its membership. Monday and Tuesday will be devoted to displays in factories and salesrooms. A floral parade is set for Wednesday afternoon, various contests Thursday afternoon, a commercial car parade Friday afternoon, and the banquet Saturday night.

At the banquet a suggestion that the Indiana Automobile Club be revived and reorganized will be made and Carl G. Fisher, president of the Indianapolis Motor Speedway Co., will be mentioned as its new president. The club is affiliated with the A. A. A., but has been inactive for some time.

It is expected that Indianapolis will be much in the limelight this season by reason of the various events scheduled at the speedway. The program for the season is as follows: May 27, 28 and 30, automobile races; June 12-18, aviation meet; July 1, 2 and 4, automobile races; August 12, 13, twenty-four hour automobile race; August 12, local balloon race; September 2, 3 and 5, automobile races; September 17, national championship balloon race, and October 22-26, international aviation flyers.

On May 27, the Prest-O-Lite trophy will be contested for in a 100-mile race and on the following day the Wheeler and Schebler trophy will be hung up for a 200-mile event. Last August the Wheeler and Schebler trophy was offered for a 300-mile race which was called off after Lynch, driving a Jackson, had covered 235 miles. It is said that more attention to the manufacture and sale of commercial cars will be paid this season by local manufacturers and dealers in Indianapolis. Notwithstanding the fact that there are probably more commercial cars in use in Indiana than in any other city in the country in proportion to size, it still remains that one or two agencies have practically controlled this class of business—a condition possibly due to the fact that dealers and manufacturers have had all of the pleasure car business they could well handle. With added facilities and more salesmen, however, commercial cars will be made a prominent feature by the local concerns. Ira V. Buckley, Harvey T. Huff and Edmund B. Walker are the directors of the Commercial Car Company organized in Indiana with an authorized capitalization of $100,000. It is said that this company will build a factory for commercial cars exclusively, and that provision will be made to go in on an extensive basis.

Indianapolis dealers, in preparation for the annual show to be held during the week beginning March 28, are adding new agencies, while new companies are being organized. Among them may be mentioned the Co Auto Motor Company, handling the Jackson, Fuller, Stearns and Westcott; the Weber Automobile Company, a new concern, will represent the Apperson; the Fisher Automobile Company has taken on the Courier, while the Conduitt Automobile Company has added the Velie.

Coming Events in the Automobiling World

Mar. 21-26.....Spokane, Wash., First Annual Automobile Show, at Princess Rink.
Mar. 21-30.....Buffalo, N. Y., Convention Hall, Third Annual Power Boat and Sportsmen's Show, Buffalo, Launch Club. D. H. Lewis, Mgr., 760 Main St.
Mar. 21-28.....Denver, Col., Convention Hall, Denver Motor Club's Annual Automobile Show.
Mar. 26-Apr. 2...Pittsburg, Pa., Duquesne Garden, Fourth Annual Show, Automobile Dealers of Pittsburg. Frank D. Sauppe, Chairman.
Mar. 26-Apr. 2...Montreal Automobile and Motor Boat Show, Official Motor and Sportsmen's Show Committee of the Automobile and Aero Club of Canada, in the Coliseum. E. M. Wilcox, Manager, 123 Bay St., Toronto.
Apr. 6-9.....Watertown, N. Y., Automobile Show, Watertown Automobile Dealers' and Manufacturers' Association, in the State Armory.
Apr. 9-16.....Elmira, N. Y., State Armory, Automobile Show, Elmira Chamber of Commerce.
Apr. 11-16.....Harrisburg, Pa., Kelker Bldg., Automobile and Sportsman's Show, Harrisburg Automobile Dealers' Association, B. R. Johnson, Manager.
Apr. 11-16.....Erie, Pa., Meyer Block, Automobile and Motorcycle Show.
Apr. 23-29.....Bangor, Me., Auditorium, Second Annual Eastern Maine Automobile and Motor Show. J. Henry Graham, Manager, Old Orchard, Me.
Jan. 7-14, 1911...New York City, Madison Square Garden, Eleventh Annual Show, Pleasure Car Division, Association of Licensed Automobile Manufacturers.
Jan. 17-24, 1911..New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A. L. A. M.
Feb. 13-25, 1911..Chicago, Coliseum, Tenth Annual National Automobile Show, N. A. A. M.

Races, Hill-Climbs, Etc.

Mar. 22-24.....Daytona, Fla., Speed Carnival, Florida East Coast Automobile Association.
Mar. 26.....Atlanta, Ga., Hill Climb, Atlanta Journal and Fulton County Automobile Club.
Mar. 28-29.....Savannah, Ga., Endurance Run to Jacksonville, Fla., Savannah Automobile Club.
Apr. 8-10 & 13-17.Los Angeles, Cal., Inaugural Meet, Motordrome.
Apr. 30-May 2...Philadelphia, Roadability Run to Atlantic City, Quaker City Motor Club.
May 2.....Flag to Flag Endurance Contest, Denver, Col., to City of Mexico.
May 5-7.....Atlanta, Ga., Track Races. Atlanta Automobile Association.
June 11.....Wilkesbarre, Pa., Annual Hill Climb Up Giants' Despair, Wilkesbarre Automobile Club.

Foreign Shows and Races

Mar. 19-Apr. 3...Berlin Automobile Show.
Mar. 22.....Elegance Competition at Monte Carlo.
Mar. 27-Apr. 4...Prague, Austria-Hungary, Automobile Show.
Mar. 28.....Brooklands, England, Easter Meeting.
Mar. 31-Apr. 8...French Spring Wheel Competition.
Apr. 2-24.....Turin, Italy, Automobile Show.
Apr. 27-28.....Brooklands, England, Two-Day Meeting.
May 1-Oct. 1.....Vienna, Austria-Hungary, Automobile and Aviation Exposition.
May 28-June 9...St. Petersburg, Russia, Automobile Exhibition.
June 2-8.....Prince Henry (German) Touring Competition.
June 13-18.....Scotland, Scottish Reliability Trials
June 20.....French Voiturette Race.
June 21.....French Stock-Car Race.
June 22-July 5....Russian Touring Competition, St. Petersburg to Moscow; also Commercial Vehicle Trials.
June 27.....Speed Trials at Kiev, Russia.
July 12-18.....Ostend, Belgium, Automobile Week.
July 20-25.....Boulogne, France, Automobile Week.
Aug. 1-15.....Ardennes, France, Meeting.
Aug. 15-Sept. 15..French Industrial Vehicle Trials.
Aug. 21.....Salon, France, One and Five Kilometer Trials.
Aug. 28.....Mont Ventoux, France, Hill Climb.
Sept. 3-6.....Liedekerke, Ostend and Voiturette Cups, at Ostend.

AUTOS PERMITTED IN OBERAMMERGAU

Passion Play committee is building a garage to accommodate 200 automobiles during the Passion Play and as a special concession to Americans automobiles will be permitted in Oberammergau during the season of the Passion Play, which is from May to October, according to advices received to-day by the North German Lloyd Company, the official representatives of the Passion Play committee in the United States.

Many persons who contemplate visiting the Passion Play during this year were much worried because of the ordinance of Oberammergau forbidding the use of power cars in the village territory. Repreesntations were made to the Passion Play committee on behalf of the Americans who wanted to take their automobiles with them and as a result the ordinance has been rescinded during May, June, July, August and September of this year.

In order properly to care for the automobilists who visit Oberammergau, the Passion Play committee has built a fireproof garage with accommodations for 200 cars and their attendants.

Contracts have been made with a leading firm to keep the roads free from dust by the use of oil or some other binding material.

Visitors will have a variety of choices in which to reach the Passion Play. Already arrangements have been made for a dirigible balloon to make daily trips between Munich and Oberammergau, while those who do not care for the balloon route may go by automobile, train and trolley, train and stage coach or may drive there from Munich, a distance of 43 miles.

BILLINGS & SPENCER GOING TO MIGRATE

HARTFORD, CONN., March 22—The drop-forging plant of the Billings & Spencer Company of this city will be removed to Dividend in the town of Rocky Hill as soon as the transfer can possibly be made. New buildings will be erected at the new site just as fast as the work can be done. This action was taken at a special meeting of the board of directors. The cause of the removal of the drop forging department to the down-river town is unique. That is to say the present plant is located in a neighborhood thick with dwelling houses and it was feared that the residents would not tolerate the operation of the drop shop 24 hours a day, which is necessary under the present busy conditions. The residents of Rocky Hill in which the town of Dividend is located are quite anxious to get the drop shop in that town and it was voted by the town that if the plant was located there a new highway will be constructed down to the site of the factory and further agreed that if possible the annual tax on the plant is not to exceed $500. The new shop of the Billings & Spencer Company is to be 150 x 70 feet. A dock will be constructed along the Connecticut River and there are also other facilities for shipment of the company's product by rail. This move does not affect any other department of the Billings & Spencer Company, in this city.

EXCESSIVE LUBRICATION SEAT OF EVILS

The smoke nuisance, dripping of oil on the pavement, and attending evils, is a subject which may lead to drastic legislation unless users of cars can be brought to a full realization of the necessity of maintaining a proper adjustment of the lubricating system and carburetor. President George J. Dunham, of the Royal Tourist Car Company, points out that carelessness is at the bottom of these evils in the main, although faulty motor construction can be regarded as having to do with the situation. Excessive lubrication, in the event that piston rings are poorly fitted, is a prolific cause of smoke, and the old-fashioned method of splash oiling accentuates the condition. In the old system of oiling, no provision was made to fix the oil level, and a careless chauffeur was thereby provided with every facility for producing the undesired smoke.

PROMISING CONDITIONS FOR ELMIRA SHOW

Arrangements are completed for the holding of the first annual automobile show in the State armory in Elmira by the Elmira Chamber of Commerce. The show will be held in the State Armory, opening at 8 o'clock Saturday evening, April 9th, and closing the night of April 16th.

The show is to be run by the Elmira Chamber of Commerce and the following committee will be in charge: John M. Connelly, president Chamber of Commerce, chairman; Clay W. Holmes, president, and Fred H. Rees, secretary, of the Elmira Automobile Club; Ralph W. Webster, of the Eclipse Manufacturing Company; E. deN. Sands, general superintendent of the American LaFrance Fire Engine Company; Hamlin Bryan, Southern Tier Motor Car Company; Ward LaFrance, LaFrance Motor Car Company; Benjamin Record, White Motor Car Company; Gordan Roberts, Rambler Motor Car Company; Major John T. Sadler, Second Battalian, 3d Reg. N. G. N. Y.; Captain W. A. Turnbull, 30 separate companies, N. G. N. Y.; Edwin Morrow, Morrow Manufacturing Co.; Roy S. Smith, secretary, Elmira Chamber of Commerce. The latter is secretary and treasurer of the show.

MONTREAL EXHIBITION AT COLISEUM

MONTREAL, March 21—The 1910 Automobile, Motor Boat, Accessories, and Sportsmen's Exhibition will open at the Coliseum, corner of Guy and Dorchester streets, on March 26 and run until April 2 inclusive. It will be held under the auspices of the Automobile Club of Canada, the Board of Directors of which are as follows: President, Clarence F. Smith; vice-president, U. H. Dandurand; directors, F. H. Anson, William Caruthers, D. McDonald, Eugent Tarte, A. J. Dawes, W. A. Edwards, F. H. Markey, L. C. Rivard, Geo. A. McNamee, secretary-treasurer.

The Coliseum is one of the largest buildings of this kind in Montreal, and is particularly well adapted to exhibitions of this character. An effort is being made to contrive decorations which will far exceed anything heretofore undertaken, and flying machines will be utilized to enhance the effect. A representative of the club went to France especially to purchase two of the best types for exhibition purposes.

CHAUFFEUR BILL AGITATES CANADA

A bill is before the House of Commons, Ottawa, to amend the Criminal Code, making it a criminal offence for chauffeurs to take out their employers' cars without their consent. The purpose of this act is to put an end to "joy-riding" by irresponsible parties, and is undoubtedly greatly in the interests not only of motorists, but of the general public.

The secretary has received a letter from Mr. Lloyd Harris, M.P., who has introduced the bill, requesting that each member of the club be urged to use his influence with his Member in Parliament to see that this bill, No. 75, is passed.

The section of this bill is as follows:

(a) "Everyone commits theft who takes or causes to be taken from a garage, stable, stand, or other building or place, any automobile or motor vehicle, with intent to operate, or drive, or use, or cause or permit the same to be operated or driven, or used, without the consent of the owner."

MAKER OF STERLING CAR RECAPITALIZES

ELKHART, IND., March 21—The Elkhart Motor Car Company, this city, which makes the Sterling car, has increased its capital stock from $200,000 to $1,000,000, and plans are being made for the doubling of the present plant. For several weeks past various Michigan men have been trying to persuade the company to move to Detroit, but the company has consistently refused to entertain any such proposals. An additional frontage of 1,000 feet has been secured adjacent to the present plant. In the future the company expects to build all its own parts, and will begin making engines within two months.

HEWITT MOTOR COMPANY ABSORBED

When the Metzger Motor Car Company took over the Hewitt Motor Company of New York, it was done with the idea of acquiring membership in the A. L. A. M., and the question of the truck business remained open with a view to further discussion. It is now decided to complete the capitalization of the Metzger Motor Car Company on a basis of $1,000,000, and to build a $100,000 plant which is to be devoted exclusively to commercial automobile building. The ground for this new undertaking will be in Detroit, at some distance from the present plant of the Metzger Motor Car Company, and the first structure to be placed thereon will have a frontage of 100 feet, a depth of 300 feet, with three stories above grade.

This is another indication of the trend in the direction of commercial automobiles, and, considering the foundation which Edward R. Hewitt laid for commercial cars, it is anticipated that the new Metzger move will develop rapidly and assume huge proportions.

It was several years ago that Edward R. Hewitt, who is one of the pioneers in automobile work, came out with the Hewitt truck, which was after he had designed and constructed a line of gasoline pleasure cars, following his first experiment in steam work. The Hewitt business developed in New York along conservative lines, the idea being to limit the truck building to definite products, for which there is a strong demand, but which requires trucks of the very best possible design.

The new plan takes into account the experimental work which was conducted by Mr. Hewitt, and will make it possible to take advantage of his efforts in this field.

ROCHESTER AUTOMOBILE CLUB WILL DINE

ROCHESTER, Mar. 23—The annual election of officers of the Automobile Club of Rochester will take place on Monday, March 28, and the annual banquet will follow. Complying with the usual custom, many stunts will be witnessed. An unusual menu card will be a burlesque fac simile of the club publication. Each guest will be presented with a souvenir. The following slate of officers is nominated to be elected: President, H. G. Strong; first vice-president, W. C. Barry, Jr.; second vice-president, W. W. Hibbard; treasurer, W. W. Dake, and secretary, Bert Van Tuyl. Directors for three years, W. C. Likly, C. J. Brown, Robert C. Shumway and W. R. Potter.

U. S. MOTOR COMPANY CRYSTALLIZING

With the new general offices of the United States Motor Company in process of completion at 505 Fifth avenue, New York, the details of the organization are being completed, and a general purchasing department, under the management of A. R. Cormully, is now established there. One of the advantages of a big merger such as this lies in the better command of the market from the point of view of the quality of material which may be had, and the more consistent prices.

DATE OF A.A.A. RELIABILITY NOT FIXED

Contrary to the general report the A.A.A. Reliability Run for the Glidden Trophy has not as yet been fixed, although it is the general impression that the matter will be taken up by the proper committee on Wednesday, March 29, and it is the expecation that the run will be started in the middle of June. Weather and other conditions will influence this date.

RAPID COMPANY LOSES ITS MANAGER

PONTIAC, MICH., Mar. 19—Harry Hamilton, the general manager of the Rapid Motor Company, died here after a week's illness of acute nephritis. He is survived by a widow and two children. Mr. Hamilton was one of the company's most valued officers, and his loss will be keenly felt.

NEW 2-CYCLE MOTOR EXHIBITED AT A.C.A.

NEW YORK, Mar. 23—Last night a two-cycle fuel injection type of motor of the Newcomb design, was placed on exhibition under running conditions, at the Automobile Club of America, and by means of lantern slides, a very interesting talk was illuminated, resulting in the disclosure of many points of unusual interest embodied in this motor. An examination of the motor discloses the two-cycle principle of the conventional design, and the particular improvements which were enlarged upon involves the use of a fuel injection pump so arranged that the quantity of fuel and the timing of the injection are variable at will by the operator, through the medium of a plunger "stop" in conjunction with a means for the angular displacement of the pump cam. The fuel is injected directly into the cylinder after the air enters, and the power of the motor is varied by changing the quantity of fuel, considering a constant volume of air. It was claimed that the thermal efficiency of this motor proved on test to be about equal to that of the Deisel motor. Any such performance, if it can be borne out in practice, will represent a great advance. One other claim for this motor is that its thermal efficiency does not decrease rapidly when the load is reduced.

DETROIT CONCERNS MULTIPLY CAPITAL

DETROIT, Mar. 19—The Regal Motor Car Company has increased its capital stock from $100,000 to $1,000,000. The former figure has for some time been merely nominal, as the business of the company had long outgrown it. The new figure represents a truer valuation, with a considerable surplus of new capital which can be devoted to extensions and improvements in the plant and equipment of the company.

Almost coincident with the Regal announcement comes the news that the Hupp Motor Car Company, also of this city, which makes the Hupmobile, has seen fit to multiply its capital by five, raising the figure from $50,000 to $250,000.

200-H.P. BENZ GIVEN CERTIFICATE

Chairman Butler, of the Contest Board of the A. A. A., has issued a certificate to Barney Oldfield, who drove the 200-horsepower Benz car at Daytona Beach, March 16, the records being as follows:

(a) One mile flying start, 27:23.

(b) One mile standing start, 40:53.

The certificate states "the above are world's records and are unequaled by any other performance made up to the present time."

A.L.A.M. WILL DINE AT HOTEL ASTOR

With 80 members on the list, the A. L. A. M. will hold a dinner at the Hotel Astor on April 7. The committee in charge comprises H. B. Joy, chairman; H. A. Lozier, Albert L. Pope, Benjamin Briscoe and R. E. Olds. It is anticipated that the members and guests, in order to be properly cared for, will fully tax the capabilities of the Hotel Astor.

TWO MORE COMPANIES JOIN A.L.A.M.

The latest advices from the A. L. A. M. are to the effect that the Chadwick Engineering Works of Pottstown, Pa., maker of the Chadwick car, and the Atlas Motor Car Company, of Springfield, Mass., maker of the Atlas car, were admitted to the association.

CHANGES IN PACKARD PERSONNEL

S. D. Waldon has moved up in the Packard organization and is now vice-president. His place as general manager has been assumed by Alvin Macauley.

SUMMARY OF 1910 RELIABILITY CONTEST RULES

THE most important amendment to the reliability contest rules for 1910 over those of last year will be found in the adoption of the fixed penalty schedule, which is applied at the final examination of the cars at the completion of a contest. In this schedule each of the essential parts of a car are given a definite number of points penalty for defective condition, greater or less, according to their relative importance to the whole make-up of the car and the condition in which such part is found at the finish of the contest.

SUMMARY OF PENALTIES.

One point per minute, or fraction thereof, late in arrival at any control or checking station.

One point per man per minute, or fraction thereof, for labor by driver or passengers.

Two points per man per minute, or fraction therof, for labor by workmen other than driver or passengers.

Two points per man per minute, or fraction thereof, for replacement of damaged parts by driver or passengers.

Four points per man per minute, or fraction thereof, for replacement by workmen other than driver or passengers.

Three points per occurrence for replenishing gasoline, oil or water, outside of fuel controls.

One point per minute, or fraction thereof, for motor stop when no work is done. No penalty for motor stop during period when work is being done on car, for which work or replacement a penalty is imposed.

FINAL OUT-DOOR OPERATIVE TESTS

Brake Penalties—50 feet perfect; for each foot, or fraction thereof, over this distance, 1 point.

Clutch—5 points for failure to climb curbs, spin rear wheels or stall motor.

Gear Set—25 points for failure to drive on any forward speed or reverse.

Motor Test—5 points for each cylinder not firing.

Front and Rear Axles—No penalty for one-fourth inch spread between wheels; 5 points for each additional one-eighth inch, or fraction thereof.

Springs—No penalty for sag of one inch; 5 points for each additional one-half inch, or fraction thereof.

FINAL EXAMINATION PENALTY

At the close of the contest, each competing car, after being properly washed, shall be delivered to the Technical Committee, who shall record all adjustments, replacements or repairs necessary to place each car in a safe and satisfactory condition, and penalties therefore shall be imposed in accordance with the following Fixed Penalty Schedule:

LUBRICATION

Broken oil feed	3
Inoperative oil feed	3
Leaky oil connection	1
Loose oiler	3
Disabled oiler	20
Lost grease cup	2
Loose grease cup	1

CARBURETION

Broken gasoline line	2
Leaky gasoline line	1
Leaky gasoline tank	1
Leaky gasoline petcock	1
Disabled throttle control	15
Broken or loose manifold	15

BRAKES

Broken operating devices	100
Broken brake	100
Loose operating devices	25

RUNNING GEAR

Broken spring leaves, each	5
Broken spring clips, each	15
Broken spring seating	15
Loose spring clip	1
Loose spring horn	15
Broken frame side member	500
Broken frame cross member	150
Bent frame pieces	75
Broken strut rods	25
Broken torsion rod	25
Lost muffler	5
Broken muffler	3
Loose muffler	2
Broken wheel	100
Loose wheel spoke	5
Broken wheel spoke	10
Broken running board	6
Broken fender iron	6
Broken fender	5
Loose fender	2
Lost mud apron	8
Broken mud apron	5
Broken rear axle	300

COOLING

Leaky water connection	1
Leaky radiator	20
Loose radiator	4
Disabled water pump	15
Inoperative fan	2
Leaky water jacket	50
Fan belt off	1

IGNITION

Loose terminal	1
Broken terminal	2
Dead battery	2
Lost commutator cover	2
Disabled commutator	20
Inoperative ignition control	5
Disabled magneto	20
Loose magneto	4

STEERING

Broken tie rod or drag link	200
Bent tie rod or drag link	25
Broken steering rod	200
Bent steering rod	25
Faulty steering gear	200
Loose steering connections	15
Broken steering knuckle	150
Bent steering knuckle	15
Broken front axle	300

MACHINERY PARTS

Broken valve	5
Broken or impaired valve spring	2
Broken cam	500
Broken camshaft	200
Broken crankshaft	500
Bent crankshaft	250
Broken valve rocker arm	10
Broken push or valve lift arm	10
Broken transmission shaft	100
Broken cardan shaft	100
Broken driving chain	30
Broken gear or pinion	25
Broken bearings	10
Broken body or chassis bolts	2
Loose body or chassis bolts	1
Lost body or chassis bolts	2
Broken clutch	250
Broken or impaired universal joint	50
Broken or lost bonnet fastener	2
Loose bonnet fasteners	1
Broken or impaired sprags	5
Broken shock absorbers	5
Loose shock absorbers	2

STEAM

Leaky condenser	20
Leaky generator	50
Faulty thermostat	20
Faulty pilot light	20
Faulty flow motor	20
Faulty gauge	5
Steam leak in line	1
Water leak in line	1

(In cases of leaky radiator or water jackets, recognition must be taken of the degree of leakage and the amount of fixed penalty modified accordingly.)

GRADES OF CONTEST

Reliability contests are graded as follows:

Grade I—A contest not exceeding six (6) days in duration, with penalties for time, road work, final operative test and final technical examination.

Grade II—A contest of more than six (6) days' duration, with penalties for time, road work, final operative test and final technical examination except that carburetor and brake adjustments may be made without penalty and spark plugs may be changed.

Grade III—A contest of any duration in which penalties are imposed for time and road work only, but in which the final operative test and final technical examination are omitted.

Grade IV—A contest of any duration in which penalties are imposed for time only.

NON-STOP RUN

For the "perfect road score" of the old rules there has been substituted a "non-stop run" defined as follows:

A run without an involuntary stop of the car outside of controls, except for tire trouble or on account of traffic congestion, shall be known as a non-stop run.

The motor must be kept running continuously while outside of controls.

The car may be brought to a standstill at any time, no work being done, and the motor kept running.

Stops for tire repairs or replacements with the motor kept running, are permissible.

Non-stop certificates may be issued to contesting cars in Grades 1 and 2 who conform to the requirements of the "Non-Stop" definition in a contest exceeding 1,000 miles in length.

CAR EQUIPMENT

Just what equipment a stock car may or may not carry in reliability contests is very clearly laid down. It may carry special mud aprons in front of radiator or bonnet screens between the side members of the frame; rubber bumpers for springs, and rebound straps; tire inflating tanks. It may not have special springs or spring windings; shock absorbers may not be added unless part of regular equipment and covers over coil boxes, magnetoes or any other part of mechanism, or screens around carburetor, are not permitted unless part of regular equipment.

TOOLS

Tools are carried in a special bag and sealed, the observers only having access to same.

PARTS

Parts carried are inventoried, officially checked and sealed.

Tire Repairs—There shall be no penalty for tire repairs, provided the engine be kept running while the repairs are being made and no other work is done. The time consumed in making the repairs, while the engine is running, shall be added to the day's running time.

Oil, Gasoline, Water and Batteries—At noon or night controls, tanks for lubrication oil, gasoline and water may be filled without penalty.

For replenishments of oil, gasoline or water at any other places the penalty is 3 points for each occurrence.

Oil or grease may be added to or may be drawn off the various cases when necessary without penalty during the half hour allowed for oiling at the end of each day's run.

Recharging of batteries will be allowed at any time, but all work in connection therewith must be done in the presence of the observer.

SEALS

To enable an observer to keep a more accurate record of work done on a car, metal and wire seals will be affixed to the bonnet, coil box, transmission case, differential case, mud pan or apron and parts of ignition system not protected by bonnet seals and any other parts, as may be necessary. There will be no penalty for breaking a seal, which will be replaced at the official garage at the end of a day's run, but the observer will note the seal broken and must report how many times thereafter access was had to the part or parts protected by such seal.

LUBRICATION

A half hour is allowed at the end of each day's run for proper lubrication of the car in the official garage, seals being broken for this purpose and replaced.

OBSERVERS

The rules concerning observers have been broadened and strengthened and the duties of observers enumerated in greater detail than heretofore, the following rule among others having been added:

Observers must not interpret rules for entrants or drivers and cannot say what work may or may not be done without danger of penalization, their duties being solely to record what is done and the exact length of time consumed in doing it.

To induce entrants, who appoint observers, to use the greatest care in their selection, the following penalty is imposed on an entrant for the act of an observer he has appointed:

If an official observer shall desert a disabled car without first obtaining the driver's signature to a statement that he has withdrawn from the contest the entrant who appointed such observer shall be disqualified and must either withdraw from the contest altogether or continue as a non-contestant. By desertion is meant leaving the car with-

out taking with him the driver and passengers. This rule will disqualify but one of the cars of an entrant in case of multiplicity of entries.

OPTIONAL PROVISIONS

The following provisions, the adoption of which in any contest is optional with the promoter, and none of which count against a car or are factors in determining the car's road score, have been added:

Rules for tire penalizations.

Rules for penalization of accessories.

The keeping of a record of lubricating oil and of gasoline consumption.

CLASSES FOR DAILY RUNNING TIME

Reliability contests shall be held under Class "A" (price classification) only and run in the seven divisions of such class, as follows:

Division	1A	$ 800 and under
Division	2A	801 to $1,200
Division	3A	1,201 to 1,600
Division	4A	1,601 to 2,000
Division	5A	2,001 to 3,000
Division	6A	3,001 to 4,000
Division	7A	4,001 and over

on which the daily time of the cars is based.

The following average speeds shall be maintained by the cars in the respective divisions:

Divisions 4A, 5A, 6A and 7A..20 miles per hr.
Divisions 2A and 3A.....18 miles per hr.
Division 1A.....16 miles per hr.

BODY EQUIPMENT CLASSIFICATION

Stock cars only are eligible, and for the purpose of trophy awards shall be divided into two classes according to body equipment: (1) touring car class; (2) runabout class, including runabouts, miniature tonneaus, surreys and double or single rumbles.

(Official) Contest Board
American Automobile Association.
March 19, 1910. S. M. BUTLER, Chairman.

EXCITING SECOND DAY OF DAYTONA RACING MEET

DAYTONA, FLA., Mar. 22—The opening of the three-day tournament, which is being held under the auspices of the Florida East Coast Association on Daytona Beach, promises to be very interesting, despite tidal interferences during the racing hours on Tuesday. The one mishap for the first day was to the automatic timing apparatus, which was traced to a short-circuit caused by salt water, following an unusually high tide. In the absence of suitable timing equipment, the one-mile speed trial, and the five-mile free-for-all championship were put off until Wednesday. These events were what the spectators wanted to see, because they include the Benz car and the Christie front wheel drive. The Benz having recently broken two world's records against time, is naturally looked upon as a most interesting performer.

As it turned out for the first day, Oldfield drove his Knox car in two of the races. He was first in the twenty-mile race against Gus Grosjean in a Pope-Hartford, but the difference was only by inches. A Chalmers "40," driven by Harry Olmsted, led in this event to the tenth mile turn, but was beaten out through stalling his motor at the turn.

The ten-mile free-for-all attracted some notice, and proved to be very exciting for a time. In this event Ormsdorf, in a Chalmers "30" crossed the line first, and 100 yards before Aultman in a Hudson "20." Hildebrand in a Chalmers "30" was third. Allen Whiting of the Automobile Club of America, representing the Contest and Technical Board of the A. A. A., presented a cup to the winner of the ten-mile handicap free-for-all.

DAYTONA, FLA., Mar. 23—To-day the conditions proved to be ripe for record-breaking time, and the annoying incidents of the first day's work were entirely eliminated.

Referring to Oldfield's new world record of 17.4 seconds for a kilometer with a flying start, it is pointed out that the previous world's record was 17.76 seconds, made by Hemery on Brooklands Track, England, in the same car. It is also to be observed that Oldfield's time for the two mile world's record of 55.87 seconds is considerably faster than the previous record of 58 4-5 seconds, which was made by Demogeot at Daytona in 1906.

Summary of First Day's Contest

Ten-mile Southern Championship—Won by Gus Grosjean, Pope-Hartford; R. M. Bond, Stearns, second; W. E. Davis, Chalmers, third; E. Hildebrand, Mitchell, fourth. Time 9 27-100.

Twenty-Mile Open Stock Car, free-for-all—Won by Barney Oldfield, Knox; Gus Grosjean, Pope-Hartford, second; Harry Ormsdorf, Chalmers, third. Time 18 60-100.

Ten-Mile Handicap, free-for-all, for the Allen H. Whiting Trophy—Won by Harry Ormsdorf, Chalmers (2:30); M. B. Aultman, Hudson (6:30), second; E. Hildebrand, Chalmers (5:25), third. Time 9:09 20-100. Other cars finished as follows: Barney Oldfield, Knox (1:30), R. M. Bond, Stearns (2:30), W. E. Davis, Mitchell (6:00), David Bruce Brown, Benz (scratch). Mile exhibitions by Oldfield in Benz and Walter Christie in Christie car. No time taken.

Summary of Second Day's Contest

One Mile Championship trial against time, won by Oldfield in Benz car; time 28 2-5 seconds. George Robertson in Christie front wheel drive car, second; time 30.39 seconds.

Stock Car record for one mile with flying start, Oldfield in Knox; time 40:35 seconds.

Florida Ten Mile Championship Race, won by Hotchkiss in Pope-Hartford; time 9.41 seconds. Bond in Stearns car, second; time not given.

Flying Kilometer Record, Oldfield in Benz; time 17.4 seconds.

Two Mile World's Championship, from a flying start, Oldfield in Benz; time 55.87 seconds.

Ten Mile Free-For-All Stock Chassis Race, Oldfield in Knox car; time 8 min. 41 sec. Ormsdorf in Chalmers 40, second; time not given.

Ten Mile Handicap, David in Chalmers 40; time 12:13. Hotchkiss with Pope-Hartford, second; time not given.

200-horsepower Benz racing automobile driven by Barney Oldfield on Florida Beach on March 23, making world's record of 17.4 seconds for flying kilometer, against previous record of 17.76 seconds made by Hemery, at Brooklands track, in the same automobile.

AMONG THE GARAGES

Salesroom and garage of Collins & Dulaney, at Paris, Tex., a structure of pressed brick, with concrete floor and metal ceiling, 50 by 100 feet on the ground plan

E. J. Moon, sales manager of the Moon Motor Car Company

Work has been started on the garage of the Reimers Motor Car Company, of Louisville, Ky., and will be rushed to completion. The plans call for a two-story structure of concrete and brick, 52 by 125 feet. The entire lower floor will be used as a garage, and will have space to accommodate about eighty cars. The second floor will be used as a repair shop, with modern equipment. The building is located in the rear of the present quarters of the Reimers Company, and will be used as an addition. The present building will be remodeled into show rooms and offices.

The fireproof garage of the White Automobile Company, at 949 Main street, East Orange, N. J., has been acquired by J. J. Meyer, of Orange. The building has a capacity of 75 machines, besides a repair shop. Mr. Mayer will make alterations, and will in addition to the garage business handle the Auburn.

William Olson and E. A. Ludvall have leased the Mount Vernon Automobile Station, at Third and Prospect avenues, Mount Vernon, N. Y., and will continue the business formerly conducted there by Chester A. Stephenson.

Athens, Ga., automobilists have a new accommodation since the recent opening of the Bishop Motor Car Company's garage on Washington street. The building is 62 by 110 feet, two stories high, and has a capacity of fifty cars. The Bishop Motor Car Company has the local agency for the Peerless, Stoddard-Dayton, Courier, Maxwell, Overland and Johnson.

The Jeannette Machine Company, of Jeannette, Pa., which has the agency for the E-M-F and Flanders, is constructing a two-story garage at 10 South Second street. The building will be of buff brick, 40 by 100 feet. The first floor will be used as a garage and salesroom, and the second as a machine and repair shop.

S. N. Taylor will build a $40,000 garage at 5207 Delmar boulevard, St. Louis. The building will be of brick, 124 by 150 feet. The floor space will be divided into two parts, one to be occupied by the Park Automobile Company, and the other by C. F. & J. R. Brown, automobile agents.

The Johnson Auto Company, of Boone, Ia., will open a garage in the Grove Building, on Lynn street, Nevada, Ia. Work on remodeling the building has already been begun. The new company will be under the management of J. R. Davidson and will handle the Cole "30."

The Burdell Auto Sales Company, which has the Columbus, O., agency for the E-M-F and Flanders, is now located in its new salesroom at 153 North Fourth street, that city. The salesroom is 40 by 110 feet. F. G. Burdell is president and general manager.

The Electric Auto Station, of Hartford, Conn., at present located at 19 Hoadley place, contemplates building a garage on Church street, below High, a more prominent location, and is having plans drawn up to that effect.

The Park Car Company, of Henderson, Ky., has taken the agency for the Moon and Regal and will open a garage on First street, near Greene, under the management of James B. Morgan.

Another garage will be added to the row on North Broad street, Philadelphia, by Irwin & Leighton. The new building will be at No. 326-328, and will be one story in height, to cost $9,500.

Thomas Hawkins, of Philadelphia, has accepted plans for a garage on the corner of Airdrie and Watts streets. The building will be two stories in height, 17 by 27 feet, to cost $4,000.

Brief Personal Mention

Julian A. Halford, managing director, Commercial cars, Limited, Luton, with headquarter offices at Cambridge Circus, London, W. C., is favoring America with his presence, partially with the expectations of making arrangements with some first-class establishment which will be able to exploit the commercial automobiles made by this company. THE AUTOMOBILE enjoyed a brief visit from Mr. Halford, and his mail address will be 164 West Eighty-first street, New York City, during the term of his visit.

It was erroneously stated in last week's THE AUTOMOBILE that M. S. Keyes, formerly with Maxwell, had taken the agency for Regal cars in the territory surrounding New York City. This was not the case, for Mr. Keyes has taken a position with the Regal Motor Car Company, as district manager for that district.

A. J. Rousseau, formerly manager of the Chicago Buick branch, has been appointed district manager of the Willys-Overland Company for Illinois, Iowa, Eastern Nebraska, Southern South Dakota, Minnesota, Northern Indiana and Western Michigan.

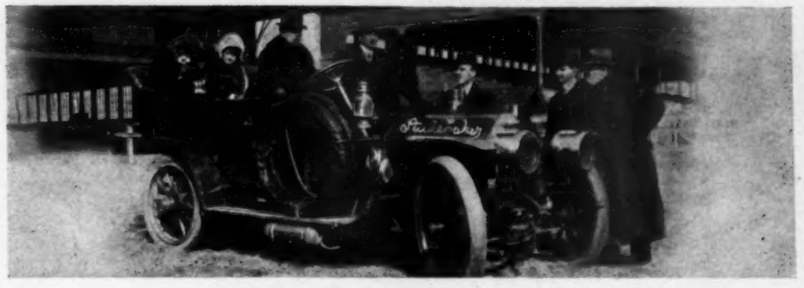
C. T. Brewster, formerly manager of the Cleveland branch of the United Manufacturers, is now connected with the Olds-Oakland Company in the capacity of State and city salesman.

R. B. Tracy, for several years Cleveland branch manager of the Michelin Tire Company, has been transferred to Chicago. As yet no one has been appointed to succeed him.

J. M. Clarke, formerly sales manager of the National Motor Vehicle Company, Indianapolis, Ind., has resigned from that position to take the agency for the National car in Denver, Col.

F. R. Bump, formerly with the Franklin Manufacturing Company, Des Moines, Iowa, has become sales manager of the Owen Motor Car Company, of Detroit, Mich.

WITH THE AGENCIES



Mme. Paulhan, the wife of the French aviator, and her friend Mme. de Pennendreff, at Jamaica Park, L. I., waiting for Paulhan to make a flight in his Farman biplane

Will Christy, vice-president of the Firestone Tire Company

COLUMBUS, O., March 19—With the passing of the season of changes in automobile agencies in Columbus, O., the announcement is made of the agencies which will have charge of the sales of cars during the season of 1910. Since the closing of the motor show given under the auspices of the Columbus Automobile Club, the agents have been busy and sales are numerous. The inclement weather has caused a delay in deliveries but the weather has not affected the sale of cars materially. Deliveries will be made during March and April, allowing time for the factories to catch up on orders.

A complete list of Columbus sales agents follows: F. E. Avery, 1199 Franklin avenue, Packard and Waverly Electric; The Burdell Auto Sales Company, 153-155 North Fourth street, E-M-F and Flanders "20"; The Robert F. Boda Automobile Company, 30 West Main street, Mitchell and National; the Columbus Buggy Company, Fourth and Gay streets, Firestone-Columbus and Columbus Electric; The Curtin-Williams Company, 122 South Parsons avenue, Cadillac, Winton. Peerless and Baker Electric; Broad-Oak Auto Company, 621 East Broad street, The Chalmers, Hudson and Pierce-Arrow; The Franklin Motor Car Company, Fourth and Spring streets, Franklin and Reo; The Charles Schiear Motor Car Company, Fourth and Spring streets, Hupmobile and Velie; The American Auto Company, Fourth and Spring streets, American; The Speedwell Company, Fourth and Spring streets, Speedwell; Howald and Wilkinson, Fourth and Spring streets, Buick and Welch-Detroit; Eclipse Auto Company, 955 South High street, K-R-I-T; The Central Ohio Motor Car Company, 61 East Spring street, Olds and Oakland; O. G. Roberts and Co., 933 East Gay street; Lexington, Marion, Overland, Jackson, Stearns and Stoddard-Dayton; The Francisco Automobile Company, 856 North High street, Ohio; The Ohio Motor Car Company, West Russell street, Ford; the Studebaker Company, Fourth and Chestnut streets, Studebaker; United States Carriage Company, 309 South Fourth street, Apperson, Great Eagle and Rauch Lang; Maxwell-Briscoe Columbus Company, 58 to 62 East Spring street, Maxwell; Iroquois Auto Company, 17 West Mound street, Empire and Grabowsky truck; Williams and Schlereth, East Long street, Pope-Hartford; The Love Garage Company, High street and Sixth avenue, White and Cole "30"; The Franklin Cycle and Supply Company, East Gay street, Demot; The Early Automobile Company, High and Town streets, Rambler, Babcock Electric, Whiting, Paterson and Warren-Detroit; R. C. Westcott, 958 North High street, Regal; Reliance Truck and Transfer Company, Third and Lynn streets, Reliance trucks; Miller Machine Company, 705 Ann street, Premier.

The Otto Gas Engine Company, of Philadelphia, which attracted much attention at the Palace show with its new Otto car, has established a New York agency at 144 W. Thirty-ninth street.

C. W. Matheson, president of the Matheson Automobile Company, entertained his friends of the fraternity at a luncheon which was given on March 22 at 12.30 P. M. The guest of honor on this occasion was the "Silent Six Matheson."

N. Lazarnick, commercial photographer, has opened a branch in Detroit, Mich., at 870 Woodward avenue, under the management of Milton B. Kolb. This arrangement puts Lazarnick in a position to do prompt work in the photographic line.

Latest advices from the Jeffery-Dewitt Company, spark plug manufacturers, 217-219 High street, Newark, N. J., is to the effect that this well-known product will hereafter be manufactured in a well-equipped plant at Detroit, Mich.

The Whiting sales agency has opened headquarters at 111-115 South Beatty street, Pittsburg, and will have the exclusive agency for the Whiting "20" and the Whiting "40" cars made by the Flint Wagon Works Company of Flint, Mich.

R. H. Ohr, Mercer, Pa., has bought the Oldsmobile agency of Alpha M. Brown, in New Castle, Pa., and will also have the Oakland agency in that city. He has for years handled the Oldsmobile cars in Mercer, Pa.

The Automobile Manufacturers' Clearinghouse is the latest second-hand agency to be established in Pittsburg. Its manager is W. H. LaFontaine, and it will have headquarters in Euclid Avenue, East End.

Warner speedometers will henceforth be sold in Pittsburg through a direct branch office. The branch is located at 5940 Kirkwood street, with C. J. Clapp in charge as manager.

The Grout Automobile Company, of Orange, Mass., has opened a Boston branch at 218 Elliott street. E. P. Forbes will act as manager to conduct the sales of the "Powerful Grout."

The Francisco Motor Car Company, of Columbus, Ohio, agent for the Ohio, has located a salesroom and offices at 856 North High Street. It was formerly located on the viaduct.

Thomas W. Meiklejohn and P. B. Haber, of Fond du Lac, Wis., have the agency for the Ford in that city and surrounding territory.

F. A. Emerson, Angola, Ind., has secured the agency for the Clark cars for northeastern Indiana.

FARMERS OPPOSE MUNICIPAL AUTOMOBILES

WILMINGTON, DEL., March 19—The Grangers are almost unitedly opposed to the proposition of the Levy Court, the governing body of New Castle county, providing itself with two automobiles, for the purpose of supervising the county roads and bridges, nearly every Grange in the county having adopted resolutions of protest. The court is to reach a decision at its next meeting, when the bids are to be opened.

REALM OF THE MAKERS

Out for a spin in an Inter-State car on one of the good highways of northern Indiana. On such a road the Inter-State can be counted on for close to a mile a minute

F. H. Wheeler, of Wheeler & Schebler, Indianapolis

Among the interesting features in tire construction at the Boston Automobile Show, the Bragg stitched tire seemed to attract a large percentage of the interest. Thorough tests have been made with the tire for the past three years and it was first put upon the market at the New York automobile show last January. The manufacturers of this tire claim that they have eliminated the separation of fabric by the stitching process and they guarantee to make satisfactory adjustments on a 5,000-mile basis. J. V. Alden, the president of the Seamless Rubber Company of New York and general sales manager of the tire, together with his associate, Mr. Williams, gave their personal attention to their exhibit at the show. They report that their success has far surpassed their most sanguine expectations and that the prospects for their business in New England are very pleasing.

The J. I. Case Threshing Machine Co., of Racine, Wis., largest concern of its kind in the world, has placed an order for twenty-five Model 38 Overlands with the American Motor Car Sales Co. at Toledo. In place of the rumble seat, a special body, consisting of a receptable like a box, is provided, these being furnished by the Racine Manufacturing Co. Three case "transfers," or emblems are to be placed on each car, one on each side of the hood and one on the box. A smaller eagle transfer will appear on each side of the seat. It is not announced what use will be made of these cars, but it is expected that the Case company's representatives in the larger cities of the country will be provided with them, the box compartments being used for catalogues, tools, small repair parts and literature of all kinds.

Tires should always be kept inflated so hard that they stand up round and full under the load, say tire men. The Diamond Rubber Company puts this rule ahead of all others, even that of pressure gauges, because the latter does not provide for the overloaded tire. Ample inflation is urged as the most important thing for the automobilist to consider in getting maximum mileage from whatever make of tire he uses. Extensive service tests have proved this fact. Ample inflation checks the movement within the tire and reduces the element of friction and heating, produced to a great extent when tires are run partially flat. These facts put it up to the automobile owner to get the best service out of his tire equipment. The tire manufacturers are responsible for the casings and tubes but obviously the tire user must furnish the air.

Cross & Brown Company sold for Aline D. Elliott and J. S. Dickerson to Louis C. Jandorf, president of the Broadway Automobile Exchange, the northeast corner of Eleventh avenue and Fifty-eighth street, New York, a two-story and basement factory building, on a plot 100 by 100. After extensive improvements the purchasers will occupy the premises for the manufacturing end of their automobile business.

The Federal Rubber Company of Illinois has established quarters in Chicago at 1312 Michigan avenue. They will handle the Federal tire. C. C. Harbridge, J. C. Zimmerman, William Seward and Hugh Jackson are interested in the company. They were all formerly with the Chicago Michelin branch. Mr. Harbridge's successor as manager of the Michelin branch is Richard Tracy, of Cleveland.

A new booklet containing valuable suggestions to motorists on the correct air pressure for their tires is being distributed by the Firestone Tire and Rubber Company, Akron, O. It also contains recommendations on the most economical sizes to use for various loads, together with other useful data on tires and quick detachable demountable rims.

The Willard-Harlow Manufacturing Co. of Janesville, Wis., has been granted a charter in Wisconsin. The company is capitalized at $25,000. The purposes of the concern are to manufacture and deal in motor car specialties and steam heating appliances. J. C. Harlow, A. E. Bigham and P. H. Korst are the incorporators.

The Chalmers Company has selected Morgan & Wright "nobby tread" tires as equipment on the Glidden tour pathfinding car. These tires made a great record on the E-M-F pathfinding car last year and Morgan & Wright feel much elated that they have been again chosen for this, the hardest pathfinding job of the season.

The Mt. Clemens Motor Car Company, capitalized at $200,000, with $75,000 paid in, has filed articles of association at Lansing, Mich. The company will manufacture automobiles and parts and conduct a general foundry and machine shop at Mt. Clemens, a suburb of Detroit. The chief output will be a delivery wagon.

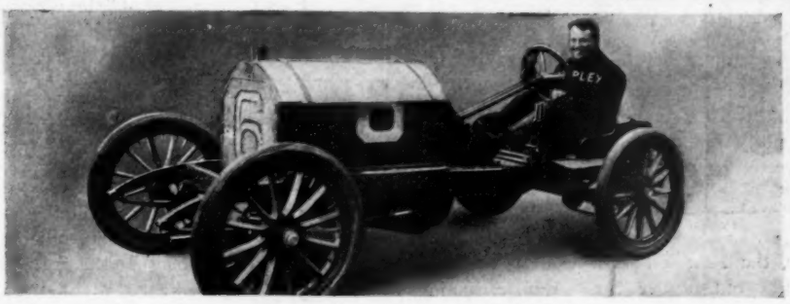
The Racine Sattley Company has contracted for the Halladay line for Central and Northern Iowa. E. A. Kiser, formerly with Cruzan & Company, Des Moines, has accepted a position with these people as manager of their automobile department, and will devote his entire time and efforts to this line.

Among the shipments last week of Premier cars from the factory of the Premier Motor Manufacturing Company was a four-cylinder touring car for Thos. W. Lawson of "frenzied finance" fame. This is Mr. Lawson's latest addition to a garage well stocked with some fin American and foreign cars.

The Mitchell-Lewis Motor Company, of Racine, Wis., issued its first limousine body type last week. This body is used on the regular Model S, six-cylinder, 50-horsepower chassis. The car was built for William T. Lewis, one of the founders of the Racine concern.

In Cleveland, the White Line Auto Express Company has been incorporated with a capital stock of $300,000 by L. B. Smith and others.

NEWS IN GENERAL



George Robertson in the 90-horsepower Simplex racer which he will drive at the Los Angeles races. The Vanderbilt winner uses Continental tires as his standard equipment

E. Le Roy Pelletier, advertising manager of the E-M-F Company

There is a sharp contest on this year between the railroads entering Pittsburg for the automobile freight business. Hitherto, the P. R. R. and the Pennsylvania company have practically controlled this business. This year, however, the Pittsburg & Lake Erie Railroad Company made a very strong bid to automobile shippers all along the New York Central lines, and as a result has been bringing in train load after train load of new cars for local agency.

One of the most interesting features of the fourth annual Pittsburg automobile show which opens March 26, will be the distribution of handsome souvenirs. The show committee has arranged for a mammoth collection of cut flowers that will be distributed every night to the lady visitors. The pennant will be in the show colors, yellow, canary and green, and will bear an immense painted design of "the girl at the wheel."

The Keim Supply Company, of 1227 Market street, Philadelphia, Pa., has purchased the business of the Auto Light & Motor Supply Company, 506 North Broad street. They will retain the latter establishment for branch and storage purposes. E. C. Leeds is president of the company; H. C. Holinger, vice-president; Joseph A. Janney, Jr., treasurer; Joseph A. Steinmetz, secretary, and J. H. Rosen, manager.

The John Obenberger Company, of Milwaukee, Wis., has been reorganized and incorporated as the Obenberger Drop Forge Company and will make a specialty of automobile parts, continuing to produce steel hammered forgings. The capital stock is $30,000. The officers of the new concern are: President, John Obenberger; vice-president, Henry C. Fuldner; secretary and treasurer, H. W. Ladish.

H. W. McMaster, one of the receivers of the Wabash-Pittsburg Terminal Railroad Company, Peter K. Soffel, real estate manager of same company, and Frederick James, of Pittsburg, have formed the Reliance Motor Truck Company of Pittsburg which is applying for a Pennsylvania charter. They will have the Western Pennsylvania agency for the Reliance truck, manufactured at Oswego, Mich.

A company has been organized in Port Jefferson, L. I., to run electric automobile 'busses this Summer between Patchogue and Port Jefferson. It is called the Suffolk Transportation Company. The 'busses will connect at Port Jefferson with the steamers of the Bridgeport-Port Jefferson Company, the service to start about the first of July.

The third class in automobile operation, under the charge of the association institute of the Columbus (Ohio) Y. M. C. A., was organized February 28 with 42 pupils. This makes 135 pupils who are taking the course. The classwork consists of lectures and practical demonstrations in a workshop equipped with several automobiles.

The Willis-Holcomb Company is showing a line of Packard commercial cars, while the Percy-Willis Company, the Conduitt Automobile Company, the Cost and Orlopp and the Van Camp Automobile Company, all prominent Indianapolis dealers, are now selling commercial cars, this being "opening week."

Madison Automobile Company, Madison, Wis., has installed a complete tire, repair and vulcanizing plant, the largest in Wisconsin outside of Milwaukee. William A. Jackson, formerly in the Michelin Tire Works, of Milltown, N. J., is manager of this department. L. F. Schoelkopf is president.

It is said that efforts are being made by the International Association of Machinists to organize a Wisconsin district of employees of automobile and allied plants. Racine, Columbus, Corliss, Janesville and other cities will be included if the organization is effected.

J. C. Murdock, of Broadhead, Wis., has a patented automobile spring which, it is said, will be adopted by the Thomas B. Jeffery Company, of Kenosha, Wis., and the White Company, of Cleveland, is also said to be figuring on using it extensively.

The National Motor Supply Company, of Cleveland, Ohio, manufacturer of portable steam vulcanizers and gasoline tank gauges, has opened a branch at 1777 Broadway, New York. The Cleveland company was organized less than a year ago.

A. B. MacGowan, a well-known salesman of the Maxwell-Briscoe Pittsburg Company, has gone into business with N. H. Wishart. The firm will continue to handle the Flentje shock preventor and the Hoffecker speedometer in Pittsburg.

A movement has been started by capitalists at Jefferson, Wis., to use part of the big Vaughn Manufacturing Co.'s implement plant for the manufacture of a light farm motor wagon. The project is not yet in definite shape.

The Rowe Automobile Company, of Waynesburg, Pa., one of the most thrifty concerns in western Pennsylvania, will build a plant at Martinsburg, W. Va., at once to manufacture automobiles and gas engines.

The New Kensington Motor Company of New Kensington, Pa., has been formed by J. W. Vernam, New Kensington, Pa., J. S. McKee, Ambridge, Pa., and J. G. Silvens, Homestead, Pa.

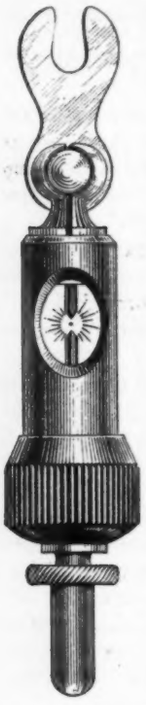
The Standard Automobile Company of Pittsburg is making rapid progress on its new building at Grant boulevard and Bellefield avenue, and will have its formal opening about May 14.

G. W. Laurie, salesman for Morgan & Wright in Boston and vicinity, will shortly assume a traveling position for the same firm, calling on the trade in the New England States.

The Mutual Manufacturing Company has been formed in Pittsburg by George Ferrer, A. J. Kraber and E. R. Cramer and will manufacture wind shields.

PROMINENT ACCESSORIES

REVIVING the old idea of the spark-gap, the New England Sales Company, of Boston, has brought out, under the name of the Phelps "Trouble Finder," a device to be inserted in the wiring between the coil or magneto and the spark plug to show whether the spark is jumping regularly. The "trouble finder" is designed to take the place of the usual high-tension terminal attachment to the spark plug. It consists of two points, separated slightly to form a gap across which the current must pass on its way to the plug. The points are properly insulated, and are inclosed in a brass tube, with a glass window through which one may watch the spark jumping across the gap. One of the points is adjustable by turning a milled nut on the outside of the tube, so that the length of the gap may be regulated.



"Trouble Finder"

For ordinary service the points are adjusted quite close together, so as to introduce as little resistance as possible. In case one cylinder should be missing, it can easily be located by looking at the row of "trouble finders"; for if there is no spark in the cylinder, there will be none across the gap of the "trouble finder." Many other claims are made for the device, such as keeping the plugs free of carbon deposits, increasing the power of the motor, making it possible to throttle down to a lower speed, and making it possible to run on nearly exhausted batteries.

In connection with the description of accessory makers' factories in and around Boston, which appeared in a recent issue, a photograph was given of the plant of the Hood Rubber Company, at Watertown, Mass., part of which is occupied by the Shawmut Tire Company, and is the home of Shawmut tires. Owing to the limitations of the photographic art but a small part of the factory could be shown, although that was perhaps sufficient to suggest its actual size. To make the situation quite clear, however, the bird's-eye view which appears below may be of assistance.

To meet the demand for a non-skid tread the Shawmut Tire Company has brought out its "X-tra Tread," in which a raised design is molded into the tread layer of rubber. The design consists of circumferential rows of projections of a six-pointed star shape. The rows are so arranged that the stars in one row alternate with those of the rows on each side. This tread offers to the road surface a great number of sharp points, giving the maximum resistance to skidding, but at the same time the points do not bear the weight of the car, and so do not easily wear off.

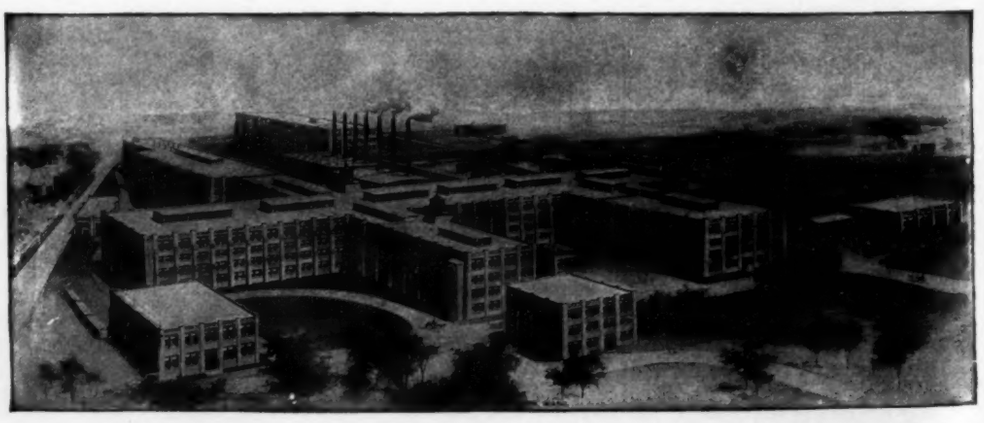
Another New England product is the "Eagle" exhaust whistle, made by the Eagle Whistle Company, of Somerville, Mass. It is one of the types designed to be attached at the rear end of the muffler, having an opening through which the exhaust normally passes freely. By means of a pedal on the footboard this opening may be closed, diverting the stream of exhaust gases through the whistle proper. The outfit is simple in construction, having no hidden bolts or screws, and no internal parts which could clog up with carbon or mud. The "Eagle" is made in three sizes, suitable for any size of car, and sells at a moderate price, with the foot pedal and connections included. As a simple and effective, though inexpensive, signaling device it can be highly recommended.

On November 4, the Dover Stamping & Mfg. Co., of Cambridge, Mass., advertised for a name for a new gasoline funnel. The company considered that the funnel was too thoroughly good to have to do with an ordinary make, and it was decided to open up competition and to pay $50 to anyone who would suggest a suitable name for the funnel. The award has finally been made to C. E. Van Bibber, 256 Aspinwall avenue, Brookline, Mass., for the name "Saval." A total of 1,250 letters came from all parts of the country, but none of the other names suggested offered any of the attractions which will be noted as self-evident as the one finally decided upon.

The funnel in question has a ball check-valve which is normally closed, but opens when the funnel is resting in the filling hole of the tank. When the tank is full, simply lifting the funnel out will close the valve, and the excess gasoline which may be in the funnel will be saved, instead of running over the seat and floor. Thus the description in its name is appropriate.

Name Plate of the New Dover Funnel

Shawmut Non-skid Tire



Factory at Watertown, Mass., Where Shawmut Tires Are Made, Together with Hood Rubber Products

CONCRETE CONSTRUCTION ADVANCING IN USEFULNESS

PORTABLE structures were used up to recent times in a temporary way by contractors, sportsmen, and for camping out parties with excellent success, due to the weather-proof qualities of the houses so made, and to the further fact that they were relatively inexpensive, which desirable condition was the direct result of building in quantity. This portable idea has been extended somewhat, and from time to time improvements were made in the quality of the buildings, until today it is proper to say of them that they are portable in so far as they are made in quantity by companies of standing, and in such a way that they may be shipped to distant points, erected into place, and assume all the proportions of permanence.

The earlier types of buildings of this character were a combination of wood framing and corrugated steel, sides, ends, and roofing. They were rather unpretentious looking affairs, and the corrugated steel, despite its galvanized coating, and red paint, rusted out so persistently that three years was looked upon as a fairly good lasting time for the material. More substantial types of portable houses were made of wood throughout, and in them architectural beauty frequently played an important part These wooden houses added marvelously to the portable idea, and when the automobile became a factor in every-day life, owners of cars utilized portable houses adjacent to their residences to an increasing extent.

The fire risk, especially in cities, is sufficiently great to demand that private garages be given more than ordinary consideration especially when they are placed within 40 feet of residence properties, many of which being wooden structures. It is on this account, perhaps, that the reinforced concrete private garage becomes the subject of great importance, and the manufacturers of portable houses, understanding perfectly the advantage to be derived, are busying themselves in the production of reinforced concrete buildings of the character which can be shipped from the maker's plant to the place of erection.

The illustration here offered is of just such a building, and it attracted considerable attention at the late Boston Show, where it was exhibited by the David Craig Company, 68 and 70 Broad street, Boston, a brief description of which is as follows:

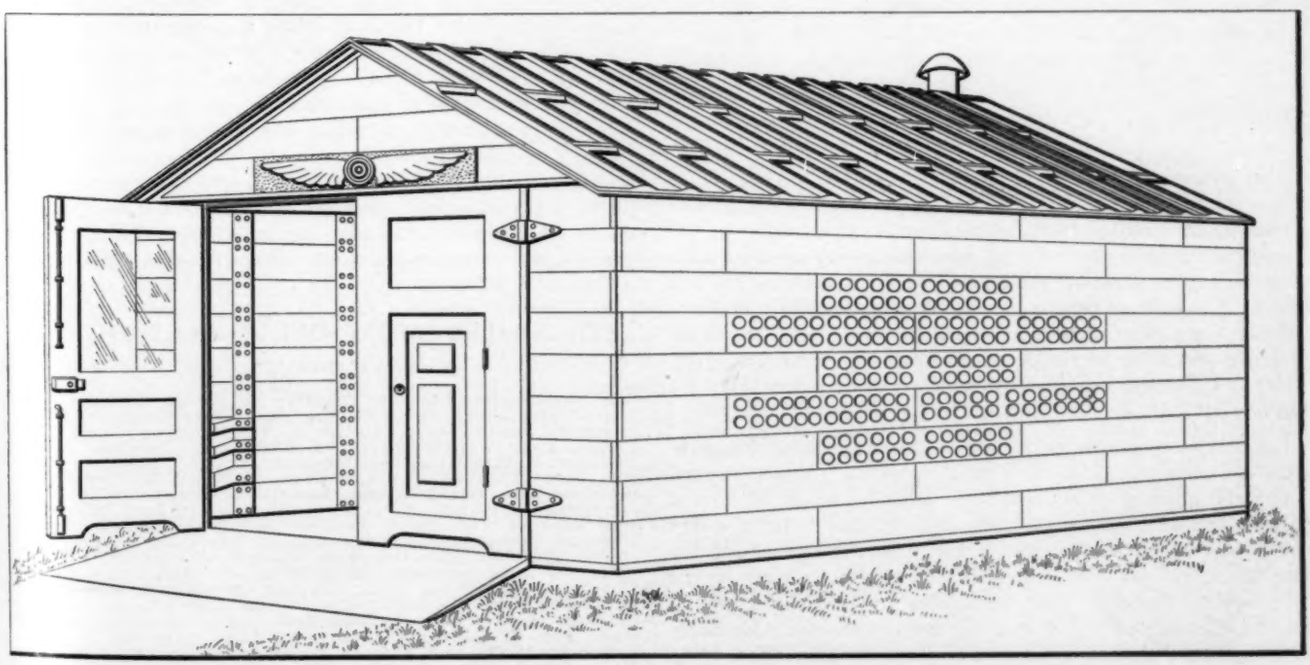
The walls are made of reinforced concrete slabs in sizes of 5 ft. by 1 ft. and 2 ft. 6 in. by 1 ft. and 1 1-2 in. in thickness. The frames are made of steel. The concrete slabs are bolted to the frame with lag screws. The only tool required to erect this garage is a monkey wrench, as they are all manufactured at the company's plant and shipped out ready for erecting.

The company claim a great improvement over the ordinary concrete block construction, as their slabs can be made with a much larger face size, and still not weigh too much for one man to handle, while the size of face gives the appearance of solid freestone. The roof frame is also of steel and covered with either copper, asbestos or corrogated galvanized iron.

Among the advantages which are represented in this structure is the method of inserting glass covered port holes in the side walls for purposes of illumination, and in this way, the disadvantages of windows are eliminated, the building becomes substantially burglar proof, and the light is distributed much more efficaciously than would be possible with a limited number of windows, while at the same time, the fire-proof idea is more definitely incorporated.

The autoist who has struggled with the small garage idea will fully understand how difficult it is to throw light onto the floor, especially under and around the car, if the car itself stands within 30 to 40 inches of the side walls. The series of ports shown in the illustration may be placed quite low down, and there may be as many of them as the autoist might elect to have, so that if the garage is barely large enough to comfortably hold a car, the floor can be adequately lighted by the simple expedient of placing an increased number of these glass bull's-eyes sufficiently low down to throw light upon the concrete floor.

In the erection of a structure as here illustrated, the most desirable results will follow if a substantial concrete foundation and floor are put down, having in mind the fact that good drainage is important, and considering the location and piping from the gasoline storage tank, which, of course, will have to be buried beneath the surface outside the building. The concrete floor would scarcely have to be more than 5 inches thick, and a bed of cinder will properly serve, if the thickness is somewhat over 5 inches. The surface of the floor should terminate in a finish of substantially neat cement.



Concrete Construction Portable Garage Which Was Exhibited at the Boston Show and Attracted Considerable Notice

R.A.C. MAKES PERFORMANCE TEST OF AUTOMOBILES

THE Royal Automobile Club of Great Britain seems to serve its members in certain particulars to a very satisfactory degree, and as an illustration of one of the club undertakings, a certificate of performance, which is numbered 184, is here given. This certificate was awarded to a 38.7 horsepower (R. A. C. rating) Napier car, after a test which was conducted under date of February 9, 1910. The motor of this car has six cylinders, with a bore and stroke of 4 and 5 inches respectively. The total weight of the car is 3,574 pounds, distributed as follows: front axle 1,714 pounds, and rear axle 1,860 pounds. The live load was found to be 489 pounds, so that the total running weight as certified to was 4,063 pounds.

The wind resistance area was 13.3 square feet, with a side entrance touring body. The road trial was over a route which is described to include Elwell, Reigate, Westorham, Crawley, Horsham and Brooklands. There were no involuntary stops recorded during this run, and the gasoline consumption was 5.28 Imperial gallons, making the fuel consumption 19.93 miles per gallon, or 36.15 ton miles per gallon.

The track test was for a distance of 13.8 miles, and the highest speed recorded was 61.12 miles with an average speed of 60.14 miles. The fuel economy under these conditions was 12.10 miles per gallon, or 21.95 ton miles per gallon.

ACCELERATION TEST ON LEVEL

Speed attained	Time in which speed is attained from rest	Distance in which speed is attained from rest
10 miles per hr	1.5 seconds	4.8 yards
15 " " "	2.8 "	13.2 "
20 " " "	4.4 "	27.0 "
25 " " "	6.5 "	49.6 "
30 " " "	8.75 "	80.0 "
35 " " "	11.75 "	129.5 "

Average acceleration for 151.56 yards, 5.38 ft. per sec.

A subsequent hill-climbing test, with a measured grade of 1 in 5.027, and a running weight as before stated, showed a speed on this grade of 14.822 miles per hour. The length of the hill was 117 yards, 1 foot, 3 inches, and the grade variations within this length were 105 feet, with a grade of 1 in. 8; 91 feet with a grade of 1 in 5, and 150 feet with a grade of 1 in 4. The test was conducted and declared official under the directions of the R. A. C. Committee, of which J. B. Orde is secretary; Francis W. Teck, chairman; Mervyn O'Gorman, chairman of Technical Committee.

It will be observed that this is test No. 184 which permits one to infer that the R. A. C. considers this class of undertaking as regular and of importance. It should be extremely valuable to makers of automobiles to be able to have models tested out by experienced men under official and open condition.

AMONG THE LATEST ACCESSORIES

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operated by a foot pedal, and the effort of the motorist is accumulated in a spring, and utilized through the ability of a flywheel involving a suitable mechanism as shown.

Non-skid devices for use with pneumatic tires have been found by experience to be thoroughly capable in every way, and, contrary to the predictions of the inexperienced, the chains do not destroy the tread of the tire, but they do prevent skidding and the tire depreciation and other dangers which are imminent when skidding occurs. Fig. C shows the Walker anti-skidding chain which was exhibited at the Albany show, and attracted much favorable comment from the visiting audience. The ring bolts which serve as tie points for the diagonal chain members, are claimed to be particularly efficacious, hence, serve a double purpose, i. e. (a) as a capable mechanical fastening for the diagonal chain members, (b) as non-skid elements.

The Universal Demountable Rim, as depicted in Fig. D, is shown in the position of dissembling, in which a diagonally parted clincher rim is taken advantage of. This rim is of the class which may be expanded in order that it will slip into place over the auxiliary rim of the felloe, and in demounting the rim may be expanded so that it will readily part from the auxiliary rim and come away without having to be jolted with a hammer. A single tool is employed in the locking process, and a latch, which is U shaped, snaps into place across centers.

Lubrication continues to be one of the most important subjects in connection with the operation of an automobile, and taking the problem as a whole, it is more important to have a positive and sufficient means mechanically, than it is to worry about the incidental differences in the respective qualities of the lubricants available for use. This should not be taken as an inference to the effect that the quality of the lubricating oil may be disregarded, but it does lay stress upon the desirability of providing a definite controllable means of lubrication. Fig. E shows a series of Maxwell-Briscoe mechanical oilers being tried out at the works of the company, and it is claimed by the maker, that they have solved the problems of oiling to such an extent that lubricant is fed to the respective journals sufficiently to assure the good which comes from profuse lubrication, so that smoking and other ills are obviated.

MAKING A DEMONSTRATION

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inder models of automobiles, and from the best information at hand, it seems that the new sloping bonnet idea, as presented at shows this year, makes a most favorable impression.

(C) Shows how a 1906 Peerless model, after it served in touring work for a considerable time, was converted into a delivery wagon, and is now used in commercial work for rapid, rather than heavy service. The body, which is of the enclosed delivery type, was especially designed for a florist, and reports which emanate from the user of the car are to the effect that it is a distinctly advantageous proposition.

(D) Presents a Reo car which was converted into a livestock express by Theodore Buchneau of Brooklyn, Iowa, and, as shown, it made 28 miles to market with two hogs and 17 shotes, the total weight being 700 pounds. This is the Reo "20," which is a 2-cylinder touring car with a detachable tonneau, which makes it convenient to substitute crates or merchandise.

LOUISVILLE SHOW OPENS AUSPICIOUSLY

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Car Company, Rapid trucks; Kentucky Automobile Company, Cadillac; thomas King, American Traveler; Klein Brothers, Harley-Davidson motorcycles; Killgore & Stilz, Frayer-Miller trucks; Hubert Levy Auto Company, Buick, Baker electrics; Longest Brothers, Stoddard-Dayton, Overland, Waverley electrics; Louisville Auto Company, National; Louisville Brass & Brazing Company, sundries; George Looms, Locomobile; Marshall-Clark Motorcar Company, Maxiell; Miles Auto Company, Packard, Woods, Detroit electrics; Olds Motor Works, Oldsmobile, Oakland; Reimers Motorcar Company, Reo, Haynes; R. O. Rubel, Jr., Curtiss Motorcycles; Southern Auto Company, Ohio, Broc electrics; Straeffer-Arterburn Auto Company, Parry, K-R-I-T; John Mason Strauss, Chalmers; Studebaker Auto Company, Studebaker gasoline and electrics; Thomas Auto Company, Winton "Six"; L. W. Thompson Company, Yale motorcycles, Fisk tires; United Auto Company, Premier; Roy E. Warner Company, Firestone tires; E. C. Walker Company, White and Stanley steamers, White gasoline; Weber Motor Vehicle Mfg. Company, Weber Motor trucks; Prince Wells Company, Rambler; Yager Motorcar Company, Peerless.